STUDY OF FACTORS AFFECTING POOR CONTROL OF BRONCHIAL ASTHMA IN CHILDREN

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Dedicated

to

my Family

&

Teachers

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LIST OF ABBREVIATIONS

ED	Emergency Department
ETS	Environmental tobacco smoking
e.g	example
FEV1	Forced Expiratory Volume 1
GINA	Global Initiative for Asthma
GERD	Gastro Esophageal Reflux Disease
HRQoL	Health-Related Quality Of Life
IgE	Immunoglobulin E
ICS	Inhalational Corticosteroids
LRTI	Lower Respiratory Tract Infection
MAQOL	Mini Asthma Quality Of Life
MDI	Metered Dose Inhaler
NAEPP	National Asthma Education And Prevention Programme
OPD	Outpatient Department
PEF	Peak Expiratory Flow
PC	Poorly Controlled
QOL	Quality Of Life
SABA	Short Acting B Agonist
WHO	World Health Organization
WC	Well Controlled

ABSTRACT

Introduction: Bronchial Asthma is a chronic inflammatory airway disease that leads to reversible narrowing and constriction of airway and tendency of the airway to over-react to stimuli.

Aim of Study: To study the factors affecting poor control of bronchial asthma in children who are on controller therapy.

Materials & methods: It will be a observational study of 18 months done in Pediatric chest Clinic of DMCH Ludhiana. Demographic details, symptoms of the children before and during the treatment will be entered in the proforma and data will be analyzed for the factors affecting poor control of asthma.

Result: Majority of children with poor control of asthma belonged to crowded area (74.2 %) and upper middle class (88.7 %) . Mean Age of study was 8.9 years. Male to Female ratio was 2.64:1. Repeated viral viral infection, exposure to dust, pollen were major risk factors affecting poor control of asthma. Children more than 11 years has poor adherence, but good technique as compared to children less than 11 year who had good adherence but poor technique.

Conclusion: It was noted that faulty technique in younger children (4 to 11 yrs.) and poor adherence in older children is an important cause of uncontrolled asthma .

Keywords: Cough, wheeze, controller therapy, poor control, Nocturnal wake up, school absentees.

TABLE OF CONTENTS

S.NO.	TOPIC	PAGES
I	INTRODUCTION	1-4
II	AIMS AND OBJECTIVES	5
III	REVIEW OF LITERATURE	6-17
IV	MATERIALS AND METHODS	18-23
V	OBSERVATIONS AND RESULTS	24-51
VI	DISCUSSION	52-64
VII	SUMMARY AND CONCLUSIONS	65-67
VIII	BIBLIOGRAPHY	68-75

APPENDICES–I

- PROFORMA
- MASTER CHART

APPENDICES–II

- APPROVAL LETTER OF THESIS PLAN
- THESIS PLAN

LIST OF TABLES

TABLE NO.	TITLE	PAGE NO.
1	Area wise distribution	25
2	Crowded versus non crowded distribution of poor control of bronchial asthma	26
3	Distribution according to kuppuswamy scale	27
4	Age wise distribution of children	28
5	Distribution according to the gender	29
6	Effect of gestation on poor control of asthma	30
7	Effect of exclusive breast feeding	31
8	Effect of comorbidities in children	32
9	Effect of comorbidities in family members on poor control	33
10	Type of controller therapy	34
11	Effect of season on poor control of bronchial asthma	35
12	Effect of emotions on poor control of asthma	36
13	Effect of pollen on poor control of asthma	37
14	Effect of food (soft drink) on poor control of asthma	38
15	Effect of exercise on poor control of asthma	39
16	Effect of agarbati candles on poor control of asthma	40
17	Effects of mosquito coils on poor control of asthma	41
18	Effect of stubble burning on poor control of asthma	42
19	List of various pollutants causing poor control of bronchial asthma	43
20	Treatment adherence of patients	44
21	Effect of inhaler device technique check list	45

22	Comparison of inhaler technique indifferent age group	46
23	Comparison of treatment adherence in different age group	47
24	Limitations in sports, play and daily activites	48
25	School Absenteeism	49
26	Parents absenteeism	50
27	Impact on sleep	51

LIST OF FIGURES

FIGURE NO.	TITLE	PAGE NO.
1	Area wise distribution	25
2	Crowded versus non crowded distribution of poor control of bronchial asthma	26
3	Distribution according to kuppuswamy scale	27
4	Age wise distribution at presentation	28
5	Distribution according to the gender	29
6	Effect of gestation on poor control of asthma	30
7	Effect of exclusive breast feeding	31
8	Effect of comorbidities in children	32
9	Effect of comorbidities in family members on poor control	33
10	Type of controller therapy	34
11	Effect of season on poor control of bronchial asthma	35
12	Effect of emotions on poor control of asthma	36
13	Effect of pollen on poor control of asthma	37
14	Effect of food (soft drink) on poor control of asthma	38
15	Effect of exercise on poor control of asthma	39
16	Effect of agarbati candles on poor control of asthma	40
17	Effects of mosquito coils on poor control of asthma	41
18	Effect of stubble burning on poor control of asthma	42
19	List of various pollutants causing poor control of bronchial asthma	43
20	Treatment adherence of patients	44

21	Effect of inhaler device technique check list	45
22	Comparison of treatment adherence in different age group	46
23	Comparison of treatment adherence in different age group	47
24	Limitations in sports, play and daily activities	48
25	School Absenteeism	49
26	Parents absenteeism	50
27	Impact on sleep	51

INTRODUCTION

The word “asthma” comes from a Greek word meaning “panting” or “gasping” and was first described by the Ancient Greek physician Hippocrates. Asthma is defined as chronic inflammatory disorder of the airways associated with increased airway hyper-responsiveness, recurrent episodes of wheezing, breathlessness, chest tightness, and coughing, particularly at night/early morning [1]. Asthma is a chronic disorder of both children and adults, with 300 million individuals affected worldwide (Global Initiative for Asthma (GINA) guidelines) [2]. Asthma causes limitations of daily activities, loss of workdays, lung function impairment, reduced quality of life and an adverse socioeconomic burden.

In India the prevalence of asthma in school children is in an increasing trend in the past decade. In a study done in lucknow [3], the prevalence of asthma was low (2.3-3.3%), but the prevalence of asthma was 11.6 % in a study done in urban Delhi [4]. In rural areas of Ludhiana and Punjab the prevalence of asthma was 2.6% and 1%, respectively [5]. Asthma is a great burden on the child, and his family due to its increasing prevalence and dearth of good treatment control.

Although the prevalence of asthma has increased over the last decades, especially so in children there is still no sound explanation for this increase. Asthma symptoms include recurrent wheezing, coughing, chest tightness, and dyspnea, with nightly and early morning symptoms being more prevalent, whereby quality of life is often reduced.

There is no single test that can confirm a diagnosis of asthma; symptoms are the primary indicators that the patient is suffering from the respiratory disorder. The most common presenting symptom in a very young child is wheeze, although this can have a number of causes without it necessarily warranting a diagnosis of 'asthma’.

As per GINA Guideliness, Asthma is diagnosed on the basis of history compromising of variable respiratory symptoms and on the basis of variable expiratory lung function. Variable respiratory symptoms includes wheeze shortness of breath, cough and chest tightness. These

symptoms are more worse in the night, early morning , triggered by exercise , laughter , and viral infections . Variable Expiratory lung function includes bronchodilator reversibility test. Positive Bronchodilator reversibilty is the improvement of FEV1 (Forced Expiratory Volume 1) more than 12 percent after giving SABA (levosalbutamol). Both the criterias should be meet to label a patient is having asthma.

It is very important to rule out all other causes of respiratory symptoms (wheeze, cough, chest tightness, shortness of breath) Chronic upper airway cough syndrome, Inhaled foreign body, Primary ciliary dyskinesia, Bronchiectasis, Bronchopulmonary dysplasia, Cystic fibrosis, Alpha1-antitrypsin deficiency, Tuberculosis before labelling a child to have an asthma.

According to the Global Strategy for Asthma Management and Prevention, there are three main features that defined asthma as chronic inflammation, bronchial hyper responsiveness and airway obstruction which forms the basis of the pathological, physiological and clinical features of asthma and defined asthma as a common chronic inflammatory disorder of the airways characterized by variable and recurring symptoms, airflow obstruction, and bronchial hyper responsiveness. The interaction of these three features of asthma determines the clinical manifestations of the disease. However, airway inflammation has remained the predominant feature underlying the pathophysiology of asthma

Need for treatment

There is no definite cure for asthma but is completely controllable in children. If not controlled at early ages, it may persist later in life and cause morbidity and mortality. It causes airway changes which at times become permanent and convert into adult asthma. Several longitudinal studies following children with asthma into adulthood have found that those children with more asthma symptoms and a lower lung function have a worse prognosis in adulthood [6-8].

Goal of treatment is to attain normal activity and to attain good control of asthma in children with medications and avoidance of triggers.

Inhaled corticosteriods are the drug of choice in children. These are known as preventers because they are prophylactic agents, working by reducing the inflammation in the airways so that there is less hyperreactivity upon contact with an allergen. For maximum efficacy, they need to be taken daily (once or twice, depending on asthma severity and preparation prescribed). For Acute Excerebrations of asthma we have bronchodilators which were known as reliever medication as they act immediately on the bronchospasm to relax the muscles around the airway and thus allow more air through.

The Global Initiative for Asthma (GINA)guidelines 2016 suggested to classify asthma control into 3 levels i.e. controlled, partly controlled and uncontrolled according to daytime and night time symptoms, limitation of activity, need for reliever, exacerbation, forced expiratory volume at 1 second (FEV1) or peak expiratory flow (PEF). The asthma severity ia also classified into 4 categories previously (mild intermittent, mild, moderate and severe persistent asthma) based on daytime and nighttime symptoms.

Controlled asthma reduces number of days of illness, number of OPD visists, emergency visits, no of hospitalizations as well as direct and indirect cost on patients and the society[9]

Uncontrolled asthma causes poor quality of life**,**and reduces work productivity at home **,** daily physical and social activities. It is responsible for school absenteeism, hospitalization and emergency room visits, as well as poor parental/caregiver and child's quality of life it also increases family and spending on health, and can lead to death also[10]

Several studies show that the prevalence of poor asthma control ranges from 57% to greater than 80%. This discrepancy occurred due to different methods applied for the study and different selected population groups because both selected patient populations 'and samples from the general population[11,12] have been used.

In the International Cross-Sectional and Longitudinal assessment of Asthma Control (LIAISON) study, the major determinant responsible for poor asthma control was seasonal worsening and persistent pollutant exposure to allergens/irritants (self-reported and reported by their

physician), followed by treatment-related issues. Not many studies have been conducted in India on measuring asthma control using objective parameters. It is found that the reports has identified that low educational status is a risk factor for uncontrolled asthma.[13,14]

There is growing concern among the parents and treating paediatricians regarding poor control of asthma despite on controller therapy and finding the triggering factors (compliance of treatment, pets, house, dust mites, wet walls, traffic area, use of woods, kerosene oil etc,) responsible for poor control.

Most of the patient are having good control of asthma and regular follow up but some patient still continues to have poor control. Irrespective of ICS use and triggers control, symptoms are not controlled in some patients. There are studies conducted in our region regarding the prevalence of bronchial asthma. Most of the patient are having good control of asthma and regular follow up but some patient still continues to have poor control. None of study has been conducted in our region regarding the poor control of bronchial asthma.

The aim of the present study was to study the factors affecting poor control of bronchial asthma who are on controller therapy.

AIMS AND OBJECTIVES

1. To study the factors affecting poor control of asthma in children who are on controller therapy.

REVIEW OF LITERATURE

Asthma is defined as a chronic inflammatory disorder of the airways in which many cells play a role in susceptible individuals this inflammation causes recurrent episodes of wheezing, breathlessness, chest tightness and cough, particularly at night and/or in the early morning.[11] These symptoms are usually associated with widespread but variable airflow limitation that is at least partly reversible either spontaneously or with treatment". Clinically Asthma is defined as consisting of one or more symptom (wheeze, shortness of breath, chest tightness, and cough) presented in acute attacks

There is worldwide 300 million cases of asthma with increasing prevalence among the children.[1] Asthma is estimated to cause approximately 180,000 deaths worldwide annually. These deaths are largely preventable with the proper treatment through long-term and/or acute care during the final attack .A study conducted in the US revealed that , Children aged 0 – 17 years have higher asthma prevalence (9.6%) compared with adults(7.7%) [5]. In India, the prevalence estimated around 5-10%. The Incidence of asthma is now increasing worldwide due to rapid urbanisation ,overcrowding-poorly ventilated homes and single room dwelling huts and environmental air pollution- rapid industrialisation/tobacco smoke

Asthma is a disease which primarily affects the smooth muscles of bronchioles which are layered with mucus to prevent the foreign body to get enter into to far into the lungs. Asthma causes the bronchioles to suddenly constrict and produce excess mucus, restricting the flow of air and causing tightness of the chest, wheeze, cough, and breathlessness. Firstly there is an unusually high level of airway sensitivity, causing the bronchioles to constrict and narrow upon exposure to certain airborne substances or environmental conditions [15]. Secondly, due to surplus production of mucus produced in the airways causing further restriction of the space reserved for airflow in the lungs [16]. Thirdly the inflammation of bronchial tissue. Microscopically, asthma is associated with disruption of the epithelial lining of the airways and an increase in airway infiltration

by T-helper (Th) lymphocytes of the Th2 variety, eosinophils, and mast cells. It has been shown that some asthmatics have higher levels of immunoglobulin E (IgE) in the blood serum than non-asthmatics [15]

Accurate asthma diagnosis is the quite challenging for the physicians. Making an accurate diagnosis is the first step towards effective treatment and management of the disease. It is based on clinical symptoms such as wheeze, shortness of breath, chest tightness and cough and presence of any symptoms at night time or early in morning when engaged in physical activity or when exposed to cold air. The presence of these key symptoms along with objective lung function assessment done by spirometry leads to improvement in accurate diagnosis of asthma. Presence of sputum eosinophils and sensitization to common allergens helps us to make diagnosis.

Asthma has no definitive cure. Its treatment aims at control of symptoms and avoidance of triggers responsible for acute exacerbations. The main focus of Paediatricians in patient of asthma is to reduce and eliminate the symptoms of asthma. Asthma managements includes pharmacological management and non pharmacological measures. Pharmacological measures involves mainly two categories of drugs. Inhaled corticosteroids being the preventor drugs and bronchodilators being the reliever drugs are the mainstay of treatment. By educating asthmatics and their families, if necessary, about the nature of their disease the hope is that they will be able to successfully prevent asthma attacks and maintain normal lung function by avoiding potential triggers. Smoking cessation is a crucial component of asthma management and is recommended Other non-drug approaches to asthma management include doctor-recommended exercise such as swimming (if appropriate), the installation of air filters at the asthmatic's place of residence, and practicing special breathing techniques.

It is well known that is no definite cure for Asthma. GINA guidelines suggests us that symptoms of asthma can be controlled. However, it is well known that Asthma control is a multidimensional concept which is defined as “patient reports of daytime and nocturnal symptoms, activity limitations due to asthma, need for rescue medications, and measures

of lung function Asthma control is a challenge in many western countries[17,18]

Children with poor control children with asthma had poor quality of life (QOL)due to frequent physician visit, lack of schoolattendance and impair routine activities.[19,20] Theasthma management is aimed to control asthmasymptoms and reduce the risk of poor control whichcan improve the patients' QOL and save the cost oftreatment.In a prospective study of asthma costs in children from Ontario, Unger et al found that hospital admissions due to asthma were the highest component of total costs (43%), followed by medications (31%), and parent productivity losses (12%) [21].

Several studies have investigated the impact of asthma control on asthma-specific and generic HRQoL, where poorly controlled asthma was found to be associated with lower HRQoL scores [22-24]. The most recent NAEPP guidelines (2007 update) emphasize the need to investigate the impact of asthma control on HRQoL, especially since clinicians do not strictly follow the NAEPP guidelines to address asthma control status.[24]

Well-controlled asthma is associated with improved health status [25], and fewer physician visits, hospitalizations and emergency room visits among children and adults [23]. In contrast, poor asthma control is directly linked with increased school absenteeism and loss in work productivity among asthma children and adults/ caregivers, respectively. Unfortunately, studies report that asthma remains uncontrolled in many asthmatic patients, despite receiving appropriate treatments [24]. Patient-reported outcomes, such as health-related quality of life (HRQoL), are useful indicators to understand the impact of poor asthma control on functional status and well-being.

A number of studies has been done to identify in adults the factor associated with partly or uncontrolledasthma. These factors responsible for partly and poor controlled were found to be oral steroid usage, thepresence of comorbidity, abnormal pulmonaryfunction, higher asthma severity, continuedexposure to triggers and lower educationalstatus.In children, the factors which related to poor control

asthma control were not well studied.A study reported 46% of the asthmatic children who used inhaled corticosteroids had poorly controlled asthma .

Asthma is multifactorial disease where a number of personal/host factors (e.g. sex, gender, family history of allergic diseases) and environmental exposures (e.g. air pollution, dampness, mold, tobacco smoke exposure, microbial exposures, allergen exposure etc) play significant roles in its etiology. This factorial association makes it difficult to control asthma.

Various risk factors responsible for poor control

It is well documented that a family history of asthma and personal history of allergy are strongly associated with childhood asthma.

Health education for children with chronic disorders is likely, therefore, to result in better health outcomes later in life. In addition to improved clinical outcomes, healthcare information can confer psychological benefits for children who face hospitalisation or other major procedures in terms of reduced levels of fear and distress.

Triggers are the substances in our environment which causes allergic reaction allergens are the substances which can cause allergic reactions.

Triggers can often be identified by observing changes in asthma symptoms.

when in close proximity to a suspected allergen or irritant. There are a number of triggers that have emerged as commonly causing exacerbation of

asthma symptoms, which include house dust mite, animal dander, viral infections, cigarette smoke, physical exercise, mould spores, cold weather and states of high emotion. However, not all have the same mechanism.

Hypersensitivity caused by allergens such house dust mite and animal dander is mediated through raised levels of IgE whereas others, such as cold weather and exercise, are thought to act on the airways directly although their exact mechanism is as yet unknown.

Numerous risk factors associated with childhood asthma have been identified. The risk factors can be categorized into personal factors such

as age, sex, ethnic background, family history of asthma and allergy; environmental factors such as environmental tobacco smoking, home dampness or mould, house dust mite, pets and heating mechanisms; behavioural factors such as diet, physical activity and screen time12. Environmental tobacco smoking is one of the risk factors with more consistent results. It is an established risk factor for pediatric asthma and has a great effect on respiratory health.

According to the World Health Organization (WHO), approximately half of the children in the world are exposed to ETS, mostly in their homesMaternal smoking, specifically, is an important risk factor associated with asthma and wheeze, particularly in primary school children.

In 1990, in a previous study of the United States, Weitzman et al.[26] observed a positive association of maternal smoking with higher rates of asthma; children whose mothers used to smoke were two times more likely to have asthma and were at four times increased likelihood to use asthma medications in their earlier life than those mothers who did not smoke

High exposures to indoor environments such as pets, dust mites, cockroach, mouse, fungi (mold) and bacteria (endotoxin) have been identified as potential risk factors to develop asthma. Some studies reported that endotoxin may act as a protective factor for asthma and asthma like symptoms in children.

A genetic component is one of the most contributing factors of childhood asthma. It is well known that asthma and atopy are associated with a family history of asthma or allergy.

There are number of modifiable and non modifiable factors responsible for poor control of asthma.

1. Genetics Asthma is a Hereditary disease. it has been proved in various epidemiological studies that parental asthma is a strongest risk factor for asthma. More than 100 genes have been found with positive association with asthma but individual effect of gene is quite small.

2. Seasonal change. In winters, the lungs are not exposed to the only cold but dry air. As the air moves in the lungs it get warmed by holding water vapors from the lungs. the respiratory linings of the lungs become very dry and dehydrated. They causes damage to lining of respiratory epithelium. when epithelium is damaged, it causes release of alarmins which will activate an intense inflammatory response leading to release of cytokines responsible for symptoms of asthma.
3. Prematurity Preterm birth can interrupt lung development in utero and is associated with early life factors which adversely affects the developing respiratory system. Jie Zhang [27] et al conducted a study and cocluded that preterm were 1.64 times (95% confidence interval: 1.45–1.84) more likely to develop asthma than term baby.
4. Breast Feeding. It is considered to be protective for asthma. Both the Swedish BAMSE and Danish COPSAC studies have demonstrated a protective effect of breastfeeding on the development of asthma
5. overweight it is observed that asthma is more common in obese than non-obese people.Jason E Lang et found that overweight and obses children had higher cancers of Boulet LP. Asthma and obesity. Clinical & Experimental Allergy 2013; 43: 8-21.
6. Air pollution. Pollutants in the air have the same effects on the children with asthmas other triggers. they irritate the airways, making them swell up and tighten up and cause breathing problems. it is seen that traffic related air pollution, nitrogen oxide and second hand smoking is a significant risk factor.
7. viral infections. Rhinoviruses are the main viruses causing LRTI which is major trigger for Asthma exacerbations. Viral airway infections and atopy may interact in a multiplicative way to promote asthma development in young children. a casual relationship has been established among infancy, LRTI and viral Infections.
8. Environment tabacoo smoke exposure. Tabacoo smoking is clearly evident to cause poor control of asthma due to multiple reasons. Smokers have a higher percentage of neutrophils and

corticosteroids being the controller therapy are not very effective in reducing neutrophils. making produces oxidative stress, which impairs the activity of histone deacetylase-2 (HDAC2), resulting in reduced anti-inflammatory activity of cortico- steroids. Finally, smoking triggers leukotriene production in patients with asthma, and leukotrienes are not reduced by corticosteroid therapy.

9. Exposure to animals (pets)it is seen that animal produces dander which is made up of made up of proteins from hair, skin flakes, urine faces and saliva. these dander's are triggers for asthma patients as they induce the release of histamine causing acute exacerbations of asthma.
10. Medications, non adherence to treatment is the one of the most important risk factors for poor control. Poor adherence is associated with significant morbidity and healthcare costs. and it should be considered in all children with poorly controlled asthma. Sub-optimal adherence has been shown to result in poor disease control, an increased risk of hospital admission and asthma-related mortality
11. Incorrect inhaler Technique, Improper asthma inhaler device use is one of the major causes associated with poor control of asthma and frequent ED visits. AL-Jahdali et al[28].conducted a study on 450 asthma patient out of which (203)45 percent have incorrect use of inhaler technique which results in poor control and more emergency visits.
12. GERD. it is seen that Gerd patient are having have repeated exacerbations of asthma. The pathophysiology behind this is refluxed gastric acid irritates the nerve ending in the esophagus generating signals to the brain. the brain responded with the impulses to the lungs that stimulates the muscles and mucus production in the airways. The small airways of the lungs constrict resulting in asthma.
13. Psychological and Socio economic factors. low socioeconomic status is related to poor control of asthma as patient consider it a taboo. Ratchadaporn Papwijitsil, et al dis a study which concluded

that there is higher prevalence ofmaternal education below bachelor degree in thepartly controlled/ uncontrolled asthma.

14. Food (cold drinks). Liquid nitrogen used for making smoky cold drinks before serving is a risk factor for triggering asthma.
15. Dust mites. They are the microscopic bugs that are present in mattresses, carpets, curtains. they causes inflammation and constriction of the smooth muscles that leads to characteristics narrowing responsible for poor control. Dust mites also release free radicals in the lungs which can damage DNA, lipids and proteins. They worsen the asthma.
16. Molds. It is a tiny fungus which is a living organism with spores that floats through air. The pathophysiology behind mold causing asthma symptoms is that it causes bronchoconstriction and mucus production in the airways causing wheezing, chest tightness. when patient of asthma inhales it, body considers it as invader and started creating antibodies to fight against these invaders.

Various studies done regarding control of asthma in different parts of world.

1 UzmaJabeen [29] conducted a cross-sectional study at The Children's Hospital and The Institute of Child Health, Lahore, Pakistan from January to December 2015 on 310 patients aged 4-15 years to check association of asthma control with degree of medication adherence. Medication adherence was assessed by using MMAS (Morisky medication adherence assessment) Questionnaire. data was analysed by using SPSS 16. It was found that the total (310) patients Asthma was well controlled in 66(21.3%),partially controlled in 71(22.9%) and uncontrolled in 173 (55.8%). Low adherence was found in 138(44.5%), medium adherence in 71 (22.9%)and high adherence in 101(32.6%). It was concluded that Medication regimen adherence is necessary for obtaining maximum therapeutic benefits in children with asthma.

2 Imane Ghanname [30] carried a prospective epidemiological study in three hospitals of Rabat-Morrocco including 396 patients with asthma from September 2010 to April 2014 in about 42 months to identify the significant risks and protective factors associated with asthma control.

For this ad-hoc questionnaire based on GINA guidelines was used. All the risk and protective factors were determined after comparing characteristics across all level of asthma control. 53% patients had controlled,18% had partly controlled and 29% had uncontrolled asthma symtoms. It was found in the study that having respiratory infections and being allergic to animals were positively associated with poor control of asthma. The conclusion was made that adherence to treatment, possession of health insurance and having more than 2 children were associated with good asthma control.

3 Eric P de Groot [31] conducted a cross-sectional survey in 203 children with asthma aged 5 to 18 years to examine the prevalence of allergic rhinitis in children with asthma and its impact on treatment of asthma control. Validated Questionnaire on rhinitis and Paediatric Asthma Control Questionnaire (ACQ) were used, Fraction of nitric oxide in exhaled air (FeNO) was measured with Niox Mino analyser;total and specific IgE levels were assessed by the Immune system. it was found out that 157(76.2%) had allergic rhinitis but only 88(56.1%) were diagnosed. Children with allergic rhinitis had worse ACQ scores. after adding nasal corticosteroid therapy, allergic rhinitis was no longer associated with incomplete asthma control. It was concluded that allergic rhinitis is common in children with asthma and has major impact on asthma control. they formulated that treatment of this condition with nasal corticosteroids may improve asthma control in children.

4 Siddharth Gosavi[32] conducted a cross sectional study on outpatient in Pulmonary Medicine at Vyedhi Institute of Medical Sciences and Reasearch Centre, Bangalore from June 2012 to December 2012 in 50 asthmatic Patients on regular medication. The objective was to know the role of factors like age, duration of asthma, severity, compliance, technique of inhalation and knowledge of asthma action plan on asthma control. Asthma control was evaluated based on history, clinical symptoms, need for short acting bronchodilators, FEV1and sputum eosinophil count with Modified MAQOL. The global score of <80% was considered as poor control. The proportions of patients under each factor in poorly controlled group was compared with well controlled. the results

were analysed using Descriptive statistics and unpaired student's T test. it was found that 33 (66%) patients were in poorly controlled category with a mean global asthma score of 58.46+_ 2.881 and 17(34%) patients in well controlled group with score of 85.2+_ 1.19. it was concluded that MAQOL is useful in evaluating asthma control. As Sputum eosinophil count correlates with asthma control and duration of asthma, age and severity leads to poor control of asthma. objective monitoring and modification of treatment strategies should be done in asthma accordingly.

5 Amujuri Krishna [33] prasad conducted a prospective government General Hospital, Kakinada, Andhra Pradesh from December 2014 to May2016 in 100 children(74 previously diagnosed,26 new cases) aged between 1-14years with asthma. The objective was to determine factors affecting control of asthma in different age groups.Children were classified as per Expert Panel Repost 3 and were followed at 1,3&6 months. 52 were well controlled (WC) and 48 belonged to poorly controlled(PC) group.

6 Silvia de Magalhaes[34] conducted across-sectional study in state Of Bahia-Brazil in 1445 children aged 4-11 years living in 24 city of salvador to assess the factors associated with poor asthma control.in the study 2 different criteria for asthma control were used to classify as poorly controlled based on symptoms- presence of any 1 more than 12 wheezing episodes, wheezing or breathlessness resulting difficulty in speaking and more than 1day of disturbed sleep/week due to asthma one hospitalisation in 1 year due to asthma it was found that children with a history of wheezing, presence of eczema were associated with poor control of asthma and presence of mould in the house was inversely associated with the poor control of asthma.

Bankole peter kuti [35] et al. did a study of 106 children with male: female ratio of 1.5:1, and majority (83.0%) had mild intermittent asthma. Suboptimal asthma control was observed in 19 (17.9%) of the children. Household smoke exposure, low socioeconomic class, unknown triggers, concomitant allergic rhinoconjunctivitis, and poor parental asthma knowledge, were significantly associated with suboptimal control

($P < 0.05$). Low socioeconomic class (odds ratio [OR] =6.231; 95% confidence interval [CI] =1.022–8.496; $P = 0.005$) and poor parental asthma knowledge (OR = 7.607; 95% CI = 1.011–10.481; $P = 0.007$) independently predict suboptimal control.

In a study conducted by Sanford and colleagues in 2010, the most common predictors of uncontrolled asthma in adults were low education, insurance status, current smoking status, body mass index (BMI) greater than 30 kg/m,^{2} and a history of gastroesophageal symptoms. Another cross-sectional study in Brazil found three factors that were associated with uncontrolled asthma: Severity of asthma, access to medications, and use of inhaled corticosteroids[36]

House-dust mite and cockroach exposure have shown that the prevalence of sensitization and subsequent development of asthma. Exposure to cockroach allergen, for example, a major allergen in inner-city dwellings, is an important cause of allergen sensitization, a risk factor for the development of asthma. In addition, allergen exposure can promote the persistence of airway inflammation and likelihood of an exacerbation.

Household cigarette smoke exposure was the single most significant factor in predicting poor control. This is comparable with other studies that found that children exposed to tobacco smoke were more likely to have moderate to severe asthma than those with mild intermittent asthma,[37] as well as increased asthma exacerbations, symptoms and negative effects on lung function[38,39]

Smoking is also a factor in poor program attendance or poor educational impact. A study, 67 (44%) children lived in households with regular or occasional smoke exposure, and asthma control in these households was significantly worse than in non-smoking households (51% of poor control versus 21% of acceptable control, P=0.005). In fact, each hour per week of smoke exposure increased the likelihood of poor control by 33%. Therefore, reducing exposure should be a high priority for clinicians and health providers. In addition, despite the use of inhaled corticosteroids in 19 of the children with smoke exposure, none achieved acceptable control. Avoidance of smoke exposure should be a relatively

simple management strategy (eg, parents smoke only outside). However, researchers acknowledge that smoking is riddled with emotional and behavioural complexities that clinicians often ignore[40]

Low socioeconomic class is an important predictor of poor control of asthma control in the study which is reported by Bloomberg *et al*.[41) and Chen et al.[42]in America. Stanford et al.[43] also reported caregivers' unemployment closely related to low social class as a significant predictor of poor asthma control in a cohort of asthmatics. Low socioeconomic class puts the caregivers at risk of not being able to meet the financial obligations in terms of procuring the appropriate rescue and controller medications for optimal asthma control. Secondly, children with asthma from low socioeconomic class are more likely to be exposed to other risks factors for asthma exacerbation and respiratory tract infections like indoor and outdoor air pollution.

Allergic rhinoconjunctivitis predisposes children to infections of the respiratory tract which are important triggers of acute exacerbation in asthmatics.[44]Allergic rhinoconjunctivitis is a common occurrence in children with asthma as they form part of the “atopic march.”[45]

Poor inhaler technique is a common problem among patients with asthma, and asthma control worsens as the number of mistakes in technique increases [46] Asthma guidelines stress the importance of patient training in inhaler use.[47] Moreover, trainers should be competent, and inhaler technique should be rechecked at every routine asthma consultation with patients demonstrating their inhalation technique.

MATERIAL AND METHODS

It was a prospective observational study done over 18 months. All the children with poor control of asthma in age group of 4 to 18 years coming to weekly chest clinic in Pediatric OPD of DMCH were included in the study . Demographic details, symptoms of the children after the treatment was entered in the structured proforma and various factors affecting poor control of asthma was noted.

STUDY DESIGN

It was a observational prospective study over a period of 18 months (1st March 2021 to 31st August 2022) done in Dayanand Medical college , Ludhiana .

Source of Data

This study was conducted in paediatric chest clinic O.P. D in Dayanand Medical College, Ludhiana , Punjab. All Children between 4-18 years age who were newly diagnosed with bronchial asthma and were started on controller therapy and did not show any control after 2 months of therapy were enrolled. Data was collected and symptoms of the children after the initiation of treatment was entered in a prestructured performa after taking due consent from the patients legally authorative representative or guardian and the data was analysed. Poor control is defined as the score is less than 19 in childhood asthma score test for children in the age of 4 to 11 years and for more than 11 years of age in asthma control test as attached in the appendix . Study was approved by the institutional ethic committee. Performa contained information regarding the demographic details of the children, clinical status of these children after the treatment of two months . There was total 62 patients included in the study.

METHOD OF COLLECTION OF DATA

INCLUSION CRITERIA:

1 Children between age of 4-18years with newly diagnosed bronchial asthma attending chest clinic was taken. Bronchial asthma diagnosis was confirmed by standard GINA guidelines.

2. Patients were started on controller therapy (Inhaled corticosteroids) . Those children who did not show any control after taking 2 months of controller therapy.

EXCLUSION CRITERIA

1. Children less than 4 years of age with multi trigger wheeze was excluded 2. Children with chronic diseases like cystic fibrosis was excluded

3. Parents who did not give consent for the study.

4. Children who used prolonged therapy from outside or who were having controlled asthma were excluded.

STUDY POPULATION.

1. Children aged 4-18 years with asthma diagnosed by pediatric consultant (incharge of chest clinic) on the basis of signs and symptoms defined by GINA guidelines (3)
2. Sociodemographic information obtained from parents, or the caregivers included age, sex, house environment, Address of child was taken in the study. Children were classified into obese and non-obese as per body mass index as per age and gender who growth charts.
3. Age at diagnosis of asthma, duration and Severity of bronchial Asthma i.e intermittent, mild persistent, moderate persistent and severe persistent was noted.
4. Use of any controller therapy in the past was asked.
5. Family and personal history of other allergic conditions such as allergic rhino conjunctivitis and atopic dermatitis was obtained.
6. Seasonal association with asthma symptoms was also considered
7. Study of gestational age at delivery of the children and whether they were exclusively breastfed or not was noted
8. Number of individuals sharing the same room as the child and overcrowding for this study was defined as having two or more persons sharing the same room as the child
9. Information about the presence of pets, tobacco, smokers/users in the household and source of fuel for household cooking was also obtained

10. Parental socioeconomic class was categorised by modified kuppuswammy Scale 2017[49]
11. All the patients with asthma needing inhaler therapy were started on controller therapy. Inhalational Corticosteroids were given by spacer and a follow up of these patients was done in chest clinic. Patients who did not have control of symptoms even after 2 months of controller therapy use, were enrolled in the study .
12. The level of asthma control for the study participants was assessed according to NAEPP (National asthma Education and Prevention programme 2020) guidelines. Children with at least one nocturnal asthma symptoms, 2 or more daytime symptoms within a month, use of rescue medication for at least twice per week and any form of limitation of normal activities as a result of asthma symptoms were classified as having poor control. Children without the highlighted symptoms were classified as having well-controlled asthma.

METHODOLOGY

Diagnosis of Asthma was done on the basis of history and clinical examination findings (cough, wheeze, chest tightness). The structured proforma (appendix) used contained the followings.

Demographic details. Age, gender were documented and besides these demographic parameters, locality (urban or rural) environment (overcrowded or uncrowded) etc . were also recorded to know the effect on the disease outcome.

Rural - A population of less than 5000 density of population less than 400 per sq km and more than 25 percent of the male working population is engaged in agricultural pursuits . [49]

Urban - In india these are the areas with in the municipal corporation, municipal committee , places having 5000 or more inhabitants , density of not less than 1000 persons per square mile or 390 square kilometers, pronounced urban characterstics and at least three fourth of the adult male population employed in pursits other than agriculture.[49]

Crowding/overcrowding. was defined as as sharing a single room by more than 2 persons of age more than 9 years of opposite sex other than husband and wife. (4)

Treatment - Treatment was started after diagnosing the patient as per standard GINA guidelines. Patients were started on Inhaler corticosteroids which is standard therapy. Inhalers of Cipla company Budesonide, Foracort (formoterol fumarate and Budesonide) was used by the patient . Huff Puff kit of Cipla for children used for less than 6 years of age and zerostat VT spacer of cipla company was used for older children. Dose of budesonide used is 100 to 800 mcg and dose of MDI (levosalbutamol) 50 mcg. Dose of montelukast used in children less than 14 years is 5 mg. For children more than 14 years is 10 mg tablet of montelukast was used .

Parents of children and adolescents were informed regarding various triggers and allergens causing poor control and taught regarding the correct technique of using inhalers .

On follow up after 2 months patients were asked about the asthma symptoms mentioned in the appendix 1 and 2 and based on that child was categorised in into poor control if child having score less than 19. Then various factors were asked from either patients (more than 11 years) or patient's attendants (primary care taker) responsible for poor control to study the association of factors with poor control .

Details regarding the treatment adherence (It includes number of doses taken by the patient) was taught to the patients and importance of continous use of inhaled inhalers was stressed upon. It is based on mathematical calculation. it is measure of

Dose of taken / dose of prescribed x 100

If the percentage of the treatment came out to be more than 80 %, child is adherent to treatment.

If the percentage on the treatment came out to be 50 to 80 % , child is intermittently adherent to treatment

If the percentage of the treatment came out to be less than 50% child is non adherent to treatment

Details of inhaler device technique was asked. various steps were to be followed during inhalation of steroids was demonstrated .

History regarding the comorbidities of patient and family members were asked. Comorbidities GERD, Allergic Rhinitis , Adeniods and nasal Polyps were asked from the patient or parents .

Allergic Rhinnitis It is defined when 2 out of 4 cardinal nasal symptoms e.g sneezing , rhinorrhea , nasal itching and nasal block present for >1 hour day or most many days in a year [50]

Adenoids adenoids hypertrophy is an obstructive condition due to enlarged adenoids This can occur with or without an acute or chronic infections of the adenoids . This condition is more common in children than adults, the adenoids naturally atrophy and regress during adolescence.[51]

Assessment of symptoms control is done by using.

For 4-11 years -Childhood Asthma Control Test

Control of Bronchial Asthma will be assessed by “Childhood Asthma Control Test” which consists of total 27 score

Score of 20 or greater; well controlled

Score of 13 to 19; not well controlled

score of 12 or less; very poorly controlled

English and Hindi version depending upon parents and children.

For 12-18 years - Asthma Control Test

The Asthma Control Test is used to determine how well a patient’s asthma is controlled. The questionnaire consists of five questions regarding the occurrence of respiratory symptoms, and assessment of symptom control during the previous 4 weeks. All 5 question is rated on a scale from 0– 5 and values are summed for the ACT score.

A score of 5-19 indicates poorly or not controlled asthma.

STATISTICAL ANALYSIS

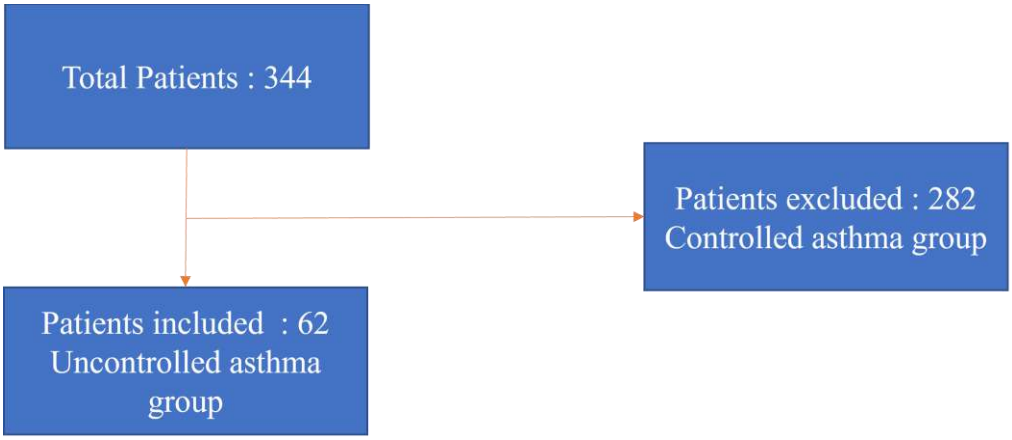
Data were described in terms of range; mean ±standard deviation (± SD), frequencies (number of cases) and relative frequencies (percentages) as appropriate. For comparing categorical data, Chi square ($\chi 2$) test was performed. A probability value (p value) less than

0.05 was considered statistically significant. All statistical calculations were done using (Statistical Package for the Social Science)SPSS 21version (SPSS Inc., Chicago, IL, USA)statistical program for Microsoft Windows.

OBSERVATIONS AND RESULTS

It was a observational prospective study done over a period of 18 months (1st March 2021 to 31st August 2022) done in Dayanand Medical college , Ludhiana. All the children with poor control of asthma with age group of 4 to 18 years were included in the study. Various observations and result that came out in the study.

Flowchart 1: Total number of patients enrolled in the study.



Demographic profile of children with bronchial asthma

In our study out of 62 patients, 36 (58.1 %) were present in urban areas and 26 (41.9 %)were present in rural areas Rural. A population of less than 5000 density of population less than 400 per sq km and more than 25 percent of the male working population is engaged in agricultural pursuits.

Urban. In India these are the areas with in the municipal corporation, municipal committee, places having 5000 or more inhabitants, density of not less than 1000 persons per square mile or 390 square kilometers, pronounced urban characteristics and at least three fourth of the adult male population employed in pursuits other than agriculture.

Table 1: Area wise distribution

Locality	No. of cases	Percentage
Urban	36	58.1%
Rural	26	41.9%
Total	62	100.0%

In our study, out of 62 patients, 36 (58.1 %) belonged to urban area and 26 (41.9 %) were from rural areas. Rural and Urban areas were defined as mentioned in materials and methods.

Figure 1: Area wise distribution

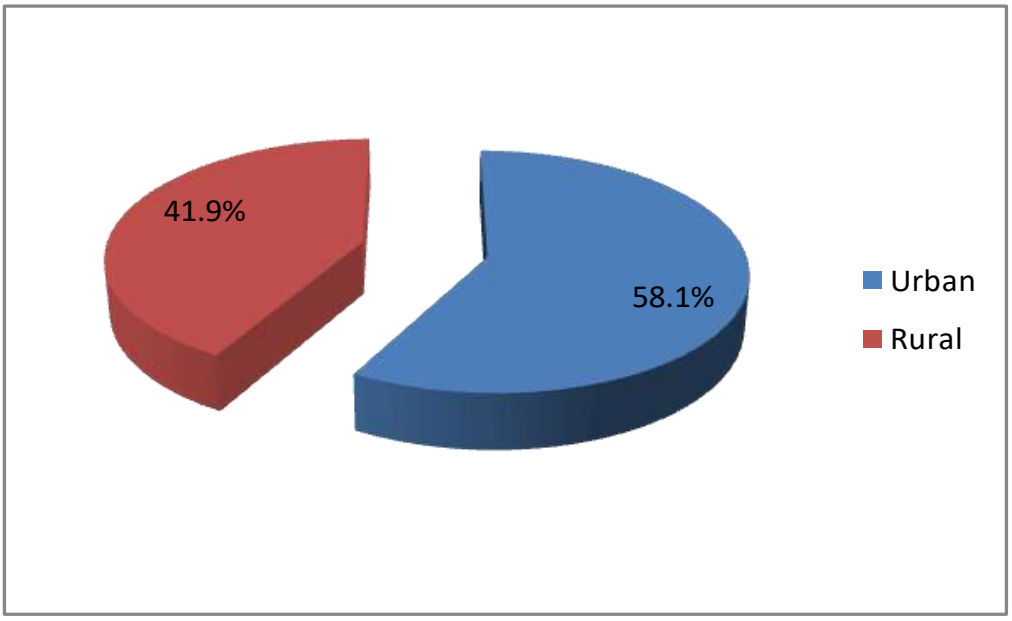


Table 2: Crowded versus non crowded distribution of poor control of bronchial asthma

Residence	No. of cases	Percentage
Non crowded	46	74.2%
Crowded	16	25.8%
Total	62	100.0%

In this study we observed that majority of children 46 (74.2%) with poor control of asthma belonged to crowded areas but only 16 (25.8%) patients were from non crowded areas.

Figure 2: Crowded versus non crowded distribution of poor control of bronchial asthma

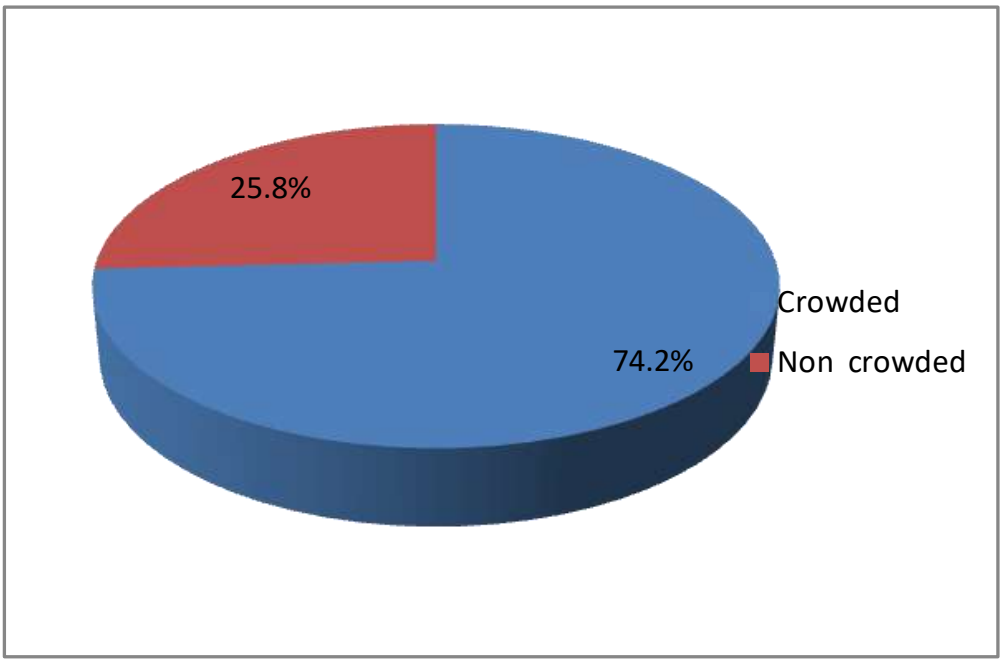
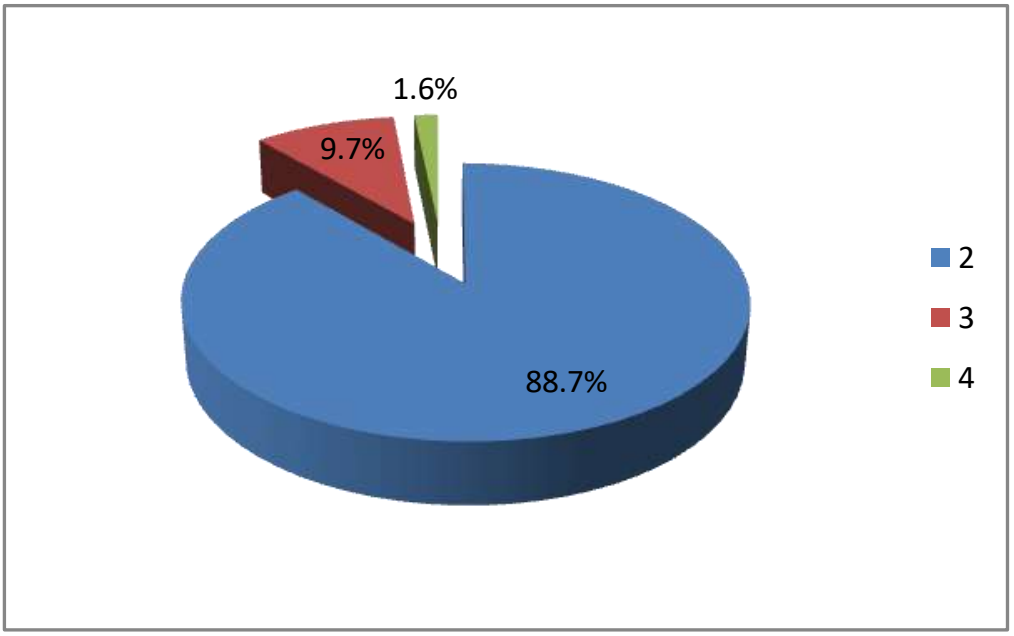


Table 3: Distribution according to kuppuswamy scale

Kupuswammy scale	No. of cases	Percentage
2 (upper middle class)	55	88.7%
3 (lower middle class)	6	9.7%
4 (upper lower class)	1	1.6%
Total	62	100.0%

In the current study out of total 62 patient in the study, 55 (88.7 %) were belonged to upper middle class, 6 (9.7 %) belonged to lower middle class and 4 (1 %) were belonged to upper lower class.

Figure 3: Distribution according to kuppuswamy scale



B) Clinical Profile of Patients

Table 4: Age wise distribution of children

Age group (in years)	No. of cases	Percentage
4-11.0	47	75.8%
> 11	15	24.2%
Total	62	100.0%

In our study, out of 62 patients, 47 (75.8 %) were between 4 to 11 years of age group and 15 patients were more than 11 years of age group mean which compromised of 24.2 % of total patient.

Figure 4: Age wise distribution at presentation

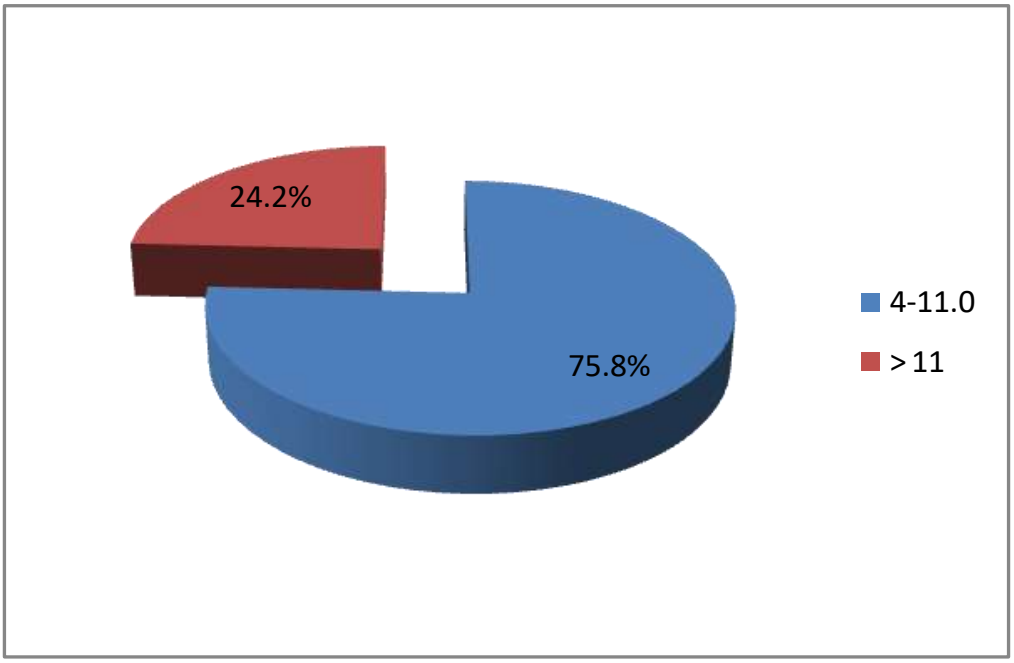


Table 5: Distribution according to the gender

Gender (M/F)	No. of cases	Percentage
Female	17	27.4%
Male	45	72.6%
Total	62	100.0%

In the current study, majority of patient were males i.e 45 (72.6 %) and 17 (27. 4 %) were females. Male to female ratio is 2.64

Figure 5: Distribution according to the gender

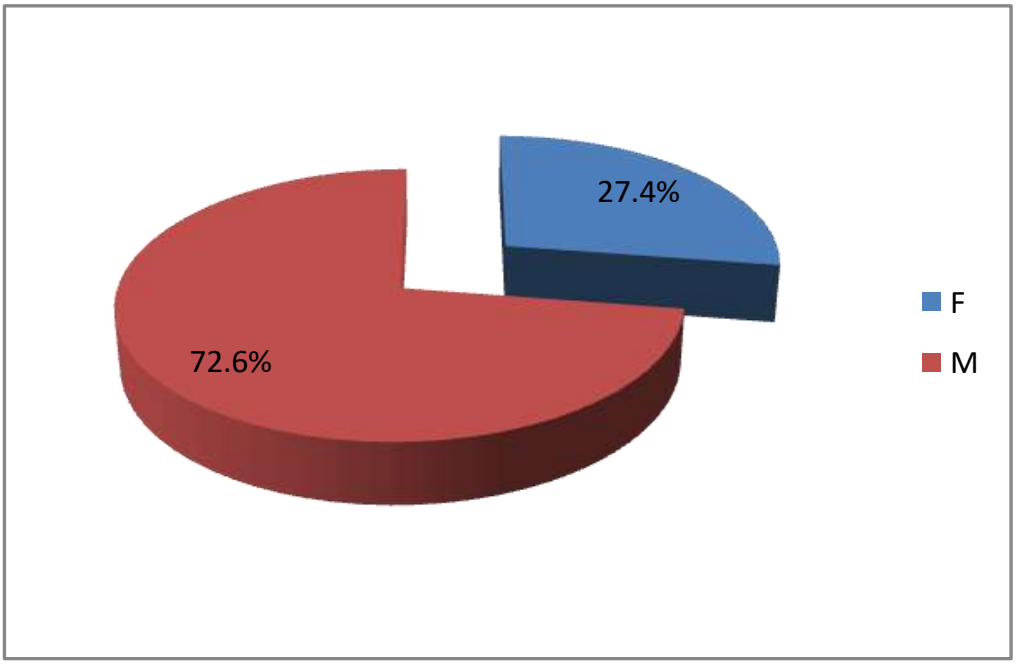


Table 6: Effect of gestation on poor control of asthma

Gestation at Birth	No. of cases	Percentage
Preterm	4	6.5%
Term	58	93.5%
Total	62	100.0%

In this study, we observed that 93.5 % (58) patients with poor control of asthma had term gestation at birth but 6.5 % (4) patient had preterm gestation at birth.

Figure 6: Effect of gestation on poor control of asthma

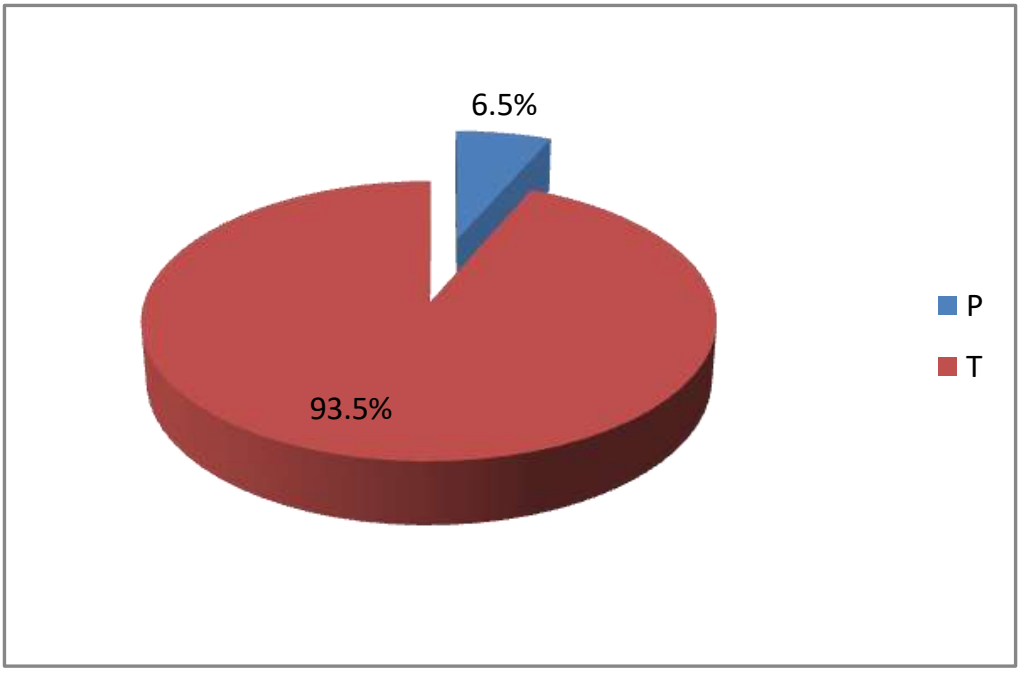


Table 7: Effect of exclusive breast feeding

Exclusive Breast feeding (4-6 months)	No. of cases	Percentage
No	11	17.7%
Yes	51	82.3%
Total	62	100.0%

It is seen that 51 (82.23 %) patient with poor control had exclusive breast feeding and 11 (17.7 %) patient had no exclusive breast feeding.

Figure 7: Effect of exclusive breast feeding

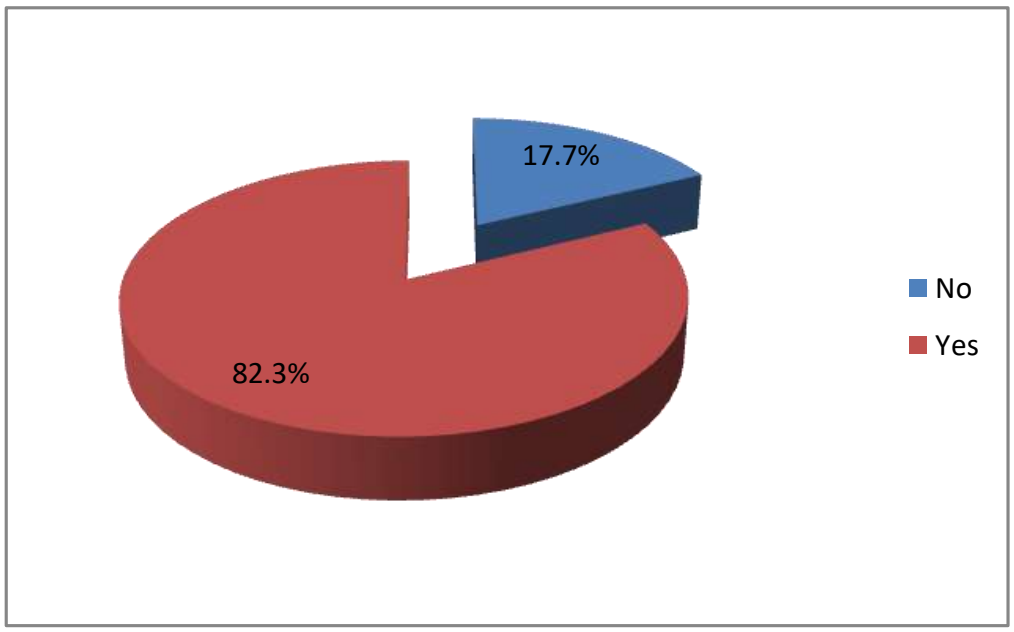


Table 8: Effect of comorbidities in children

	No. of cases	Percentage
Allergic Rhinitis	51	82.3%
Adenoids	1	1.6%
GERD	0	0.0%
Nasal polyp	**0**	0.0%

Majority of the children (82.3%) with poor control of asthma had history of allergic rhinitis and only 1.6% children had adenoids.

Figure 8: Effect of comorbidities in children

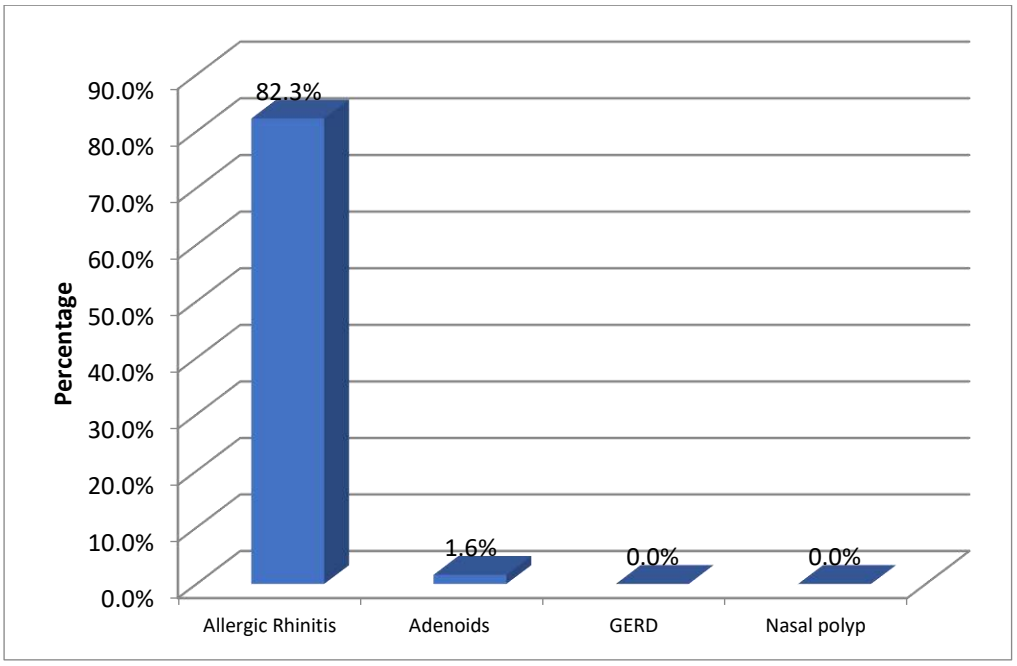


Table 9: Effect of comorbidities in family members on poor control

	No. of cases	Percentage
Asthma	21	33.9%
Allergic rhinitus	12	19.4%
Eczema	4	6.5%
Conjunctivitis	0	0.0%

Family history of children with asthma was taken and it was found that majority of the children (33.9%) had a history of asthma in the family and 19.4 % had family history of allergic rhinitis and only 6.5% had family history of eczema.

Figure 9: Effect of comorbidities in family members on poor control

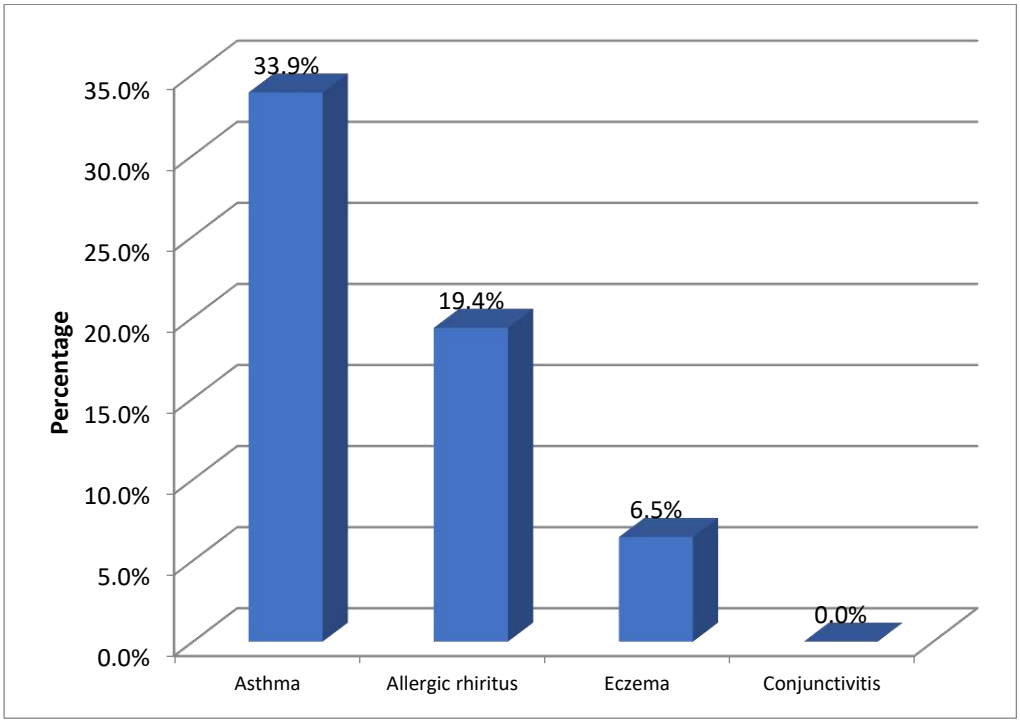
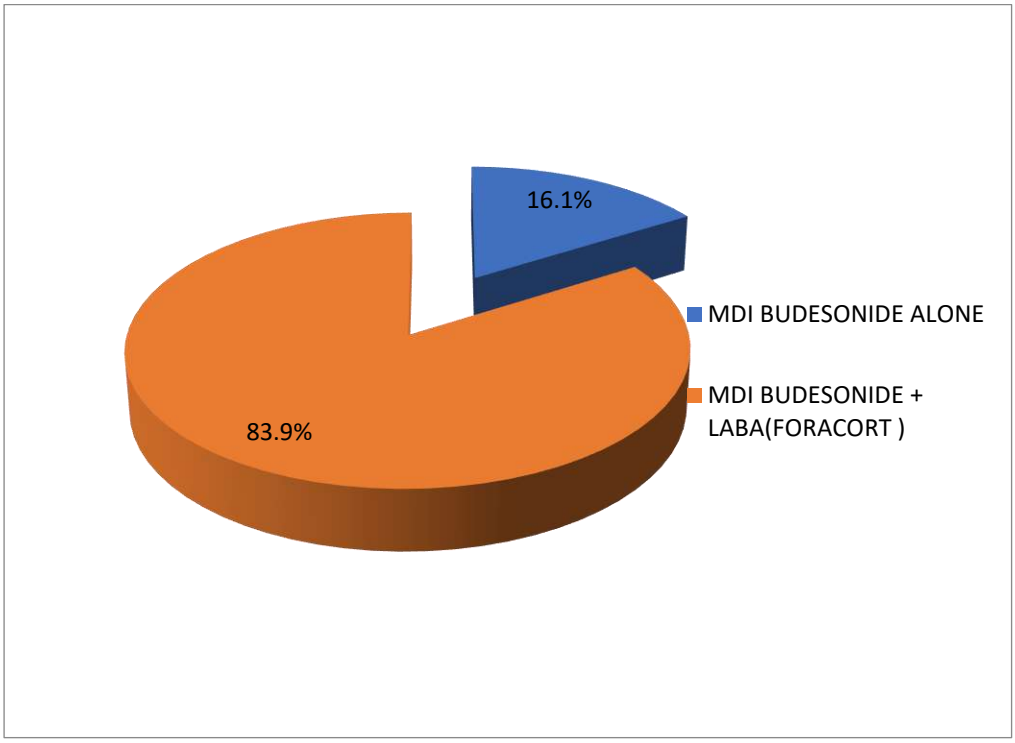


Table 10**:** Type of controller therapy

Type of Controller	No. of cases	Percentage
MDI BUDESONIDE ALONE	10	16.1%
MDI BUDESONIDE + LABA(FORACORT)	52	83.9%

In our study, 10 patients were on MDI budesonide (alone) and 52 patients were on MDI budesonide+LABA (FORACORT) combination.

Figure 10: Type of controller therapy



C) Risk factors responsible for poor control of asthma

Table 11: Effect of season on poor control of bronchial asthma

Predisposing factor	No. of cases	Percentage
Summer (march to june)	21	33.9%
Monsoon (july - oct)	8	12.9%
Winter (nov - feb)	48	77.4%

As per findings in our study, 48/62 (77.4%) patients had more frequent episodes of discomfort during winter season followed by summer season (21/62) (33.9%) and monsoon season (8/62) (12.9%)

Figure 11: Effect of season on poor control of bronchial asthma

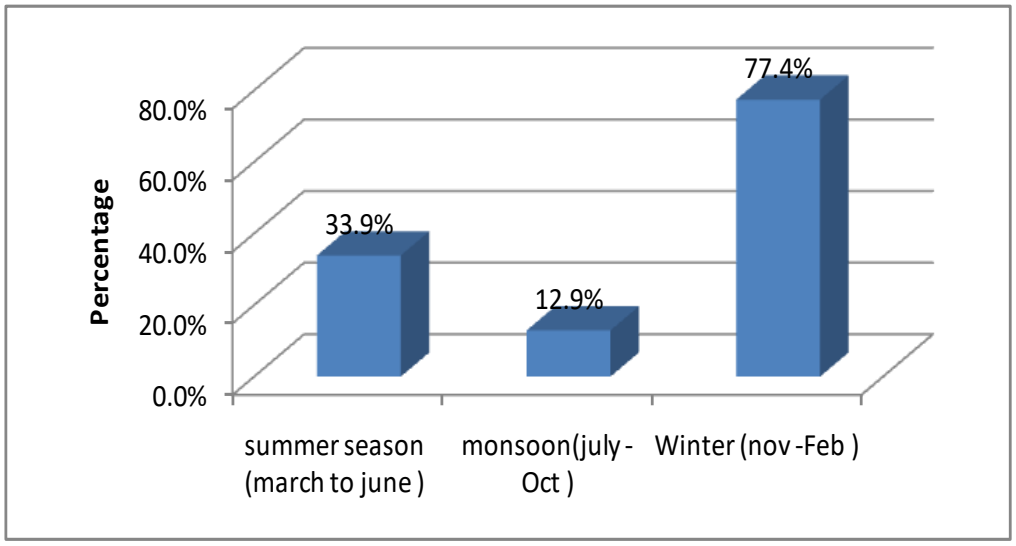


Table 12: Effect of emotions on poor control of asthma

Emotions (laughing/crying)	No. of cases	Percentage
N	53	85.5%
Y	9	14.5%
Total	62	100.0%

In our study, 9 (14.5 %) patients with poor control had associated emotional breakdown (laughing and crying) where as 53 (85.5%) patients had no association of emotions

Figure 12: Effect of emotions on poor control of asthma

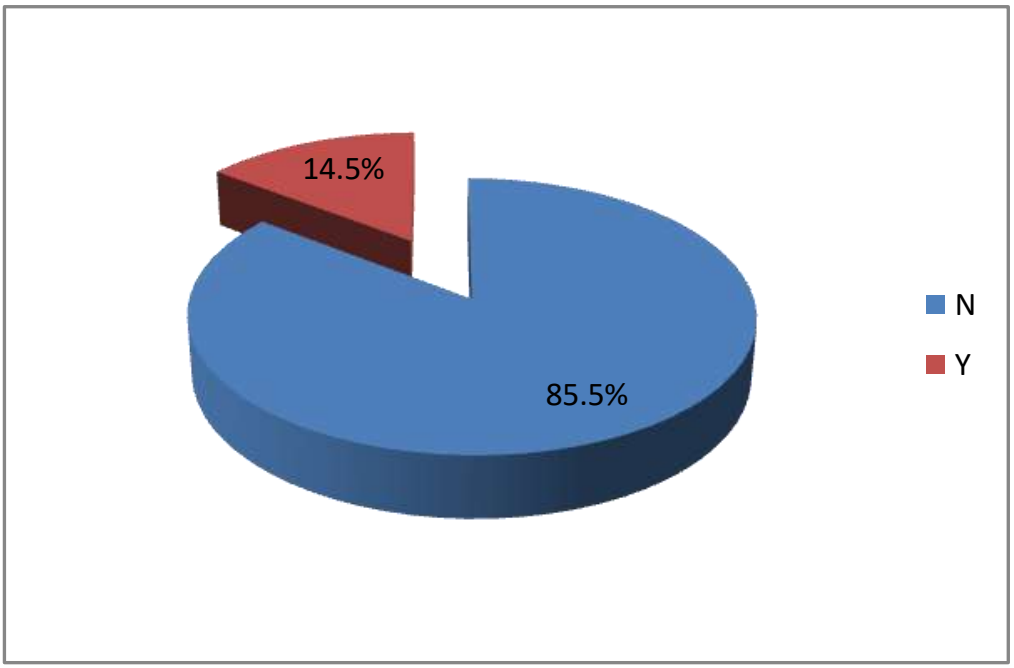


Table 13: Effect of pollen on poor control of asthma

Pollen	No. of cases	Percentage
N	58	93.5%
Y	4	6.5%
Total	62	100.0%

Exposure of pollen was present in 6.5% (4) patients with poor control of bronchial asthma where as 93.5 % (58) had no exposure of pollens

Figure 13: Effect of pollen on poor control of asthma

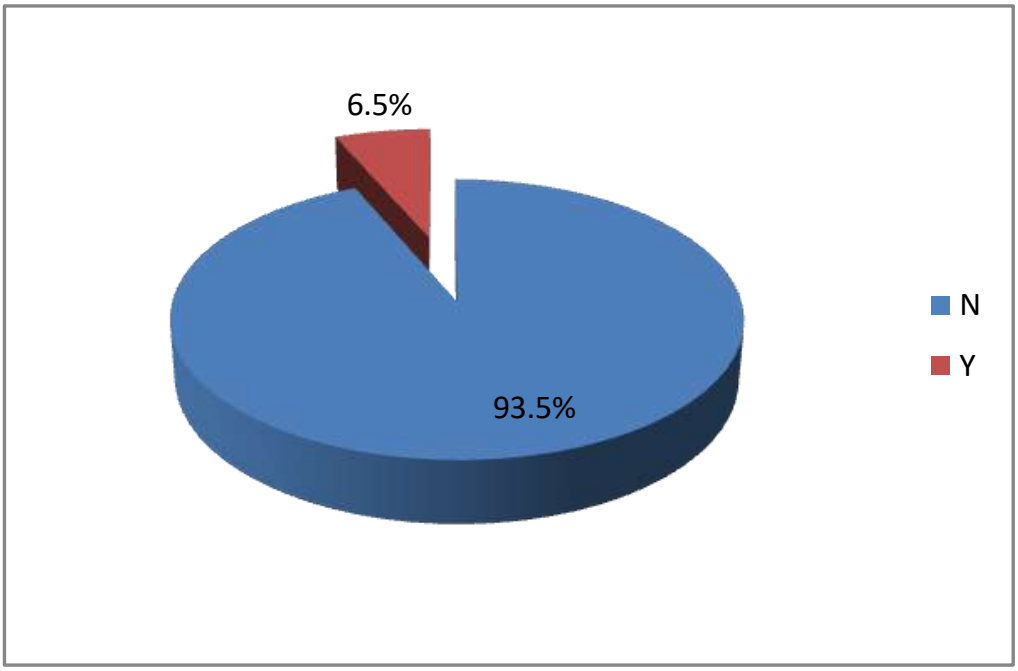


Table 14: Effect of food (soft drink) on poor control of asthma

Food	No. of cases	Percentage
Y	38	61.3%
N	24	38.7%
Total	62	100.0%

In our study, intake of soft drink (food) was present in 38.7 % (24) patients are of poor control of asthma and 38.7 % (24) patients lack similar history.

Figure 14: Effect of food (soft drink) on poor control of asthma

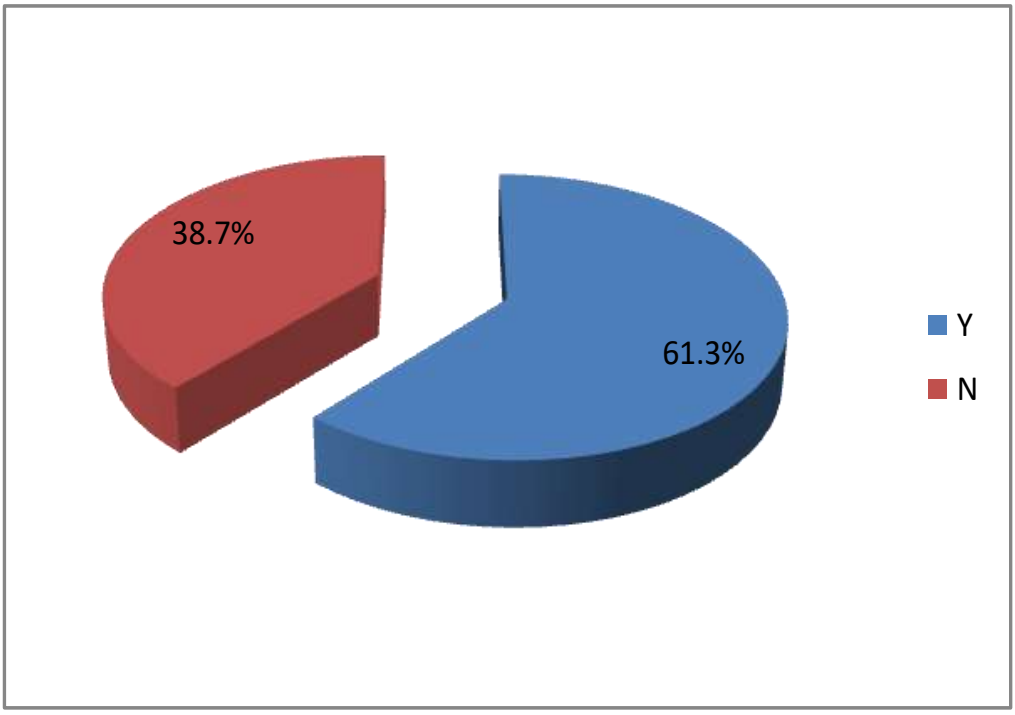


Table 15: Effect of exercise on poor control of asthma

Exercise	No. of cases	Percentage
N	45	72.6%
Y	17	27.4%
Total	62	100.0%

In our study, association with exercise was present in 17 (27.4%) patient whereas 45 (72.6 %) patients had no association with exercise.

Figure 15: Effect of exercise on poor control of asthma

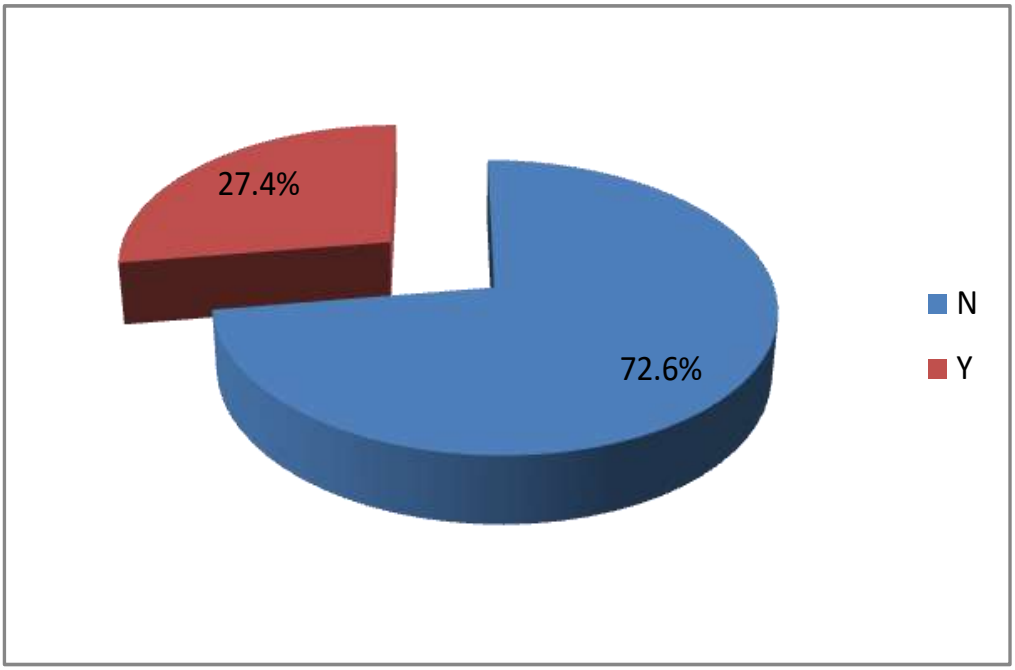


Table 16: Effect of agarbati candles on poor control of asthma

use of agarbatti /candles	No. of cases	Percentage
N	35	56.5%
Y	27	43.5%
Total	62	100.0%

In our study, 27 (43.5 %) patient with poor control has exposure to agarbatti and candles but 35 (56.5 %) has no exposure to agarbatti and candles.

Figure 16: Effect of agarbati candles on poor control of asthma

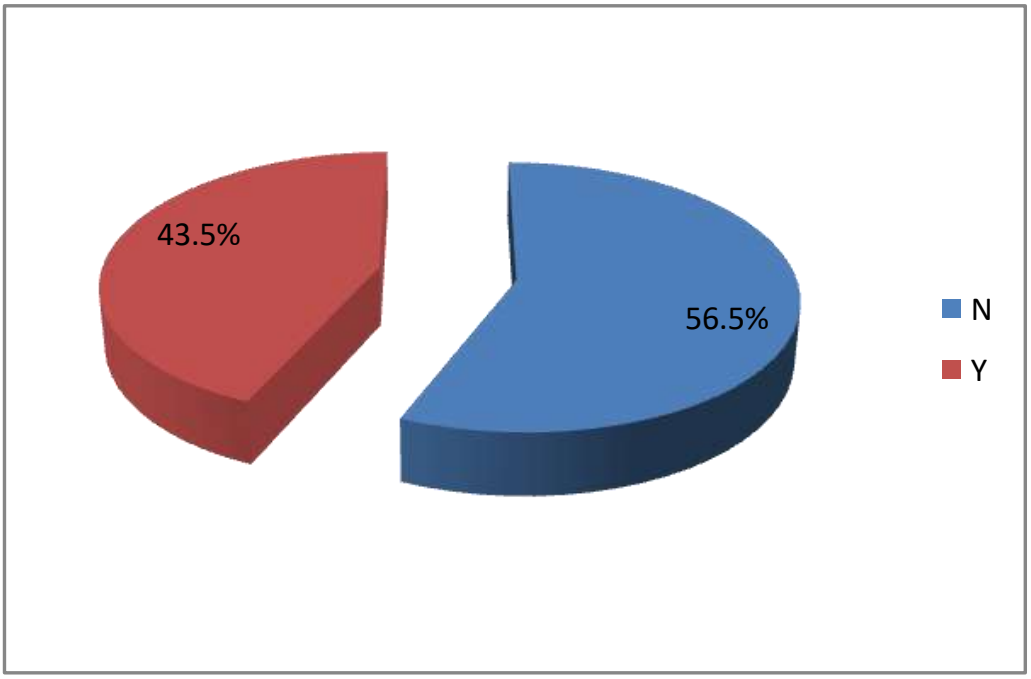


Table 17: Effects of mosquito coils on poor control of asthma

mosquito coils	No. of cases	Percentage
N	47	75.8%
Y	15	24.2%
Total	62	100.0%

It was observed that 15 (24.2 %) patient with poor control has exposure to mosquitoes coils but 47 (75.8 %) has no exposure to mosquitoes coils.

Figure 17: Effects of mosquito coils on poor control of asthma

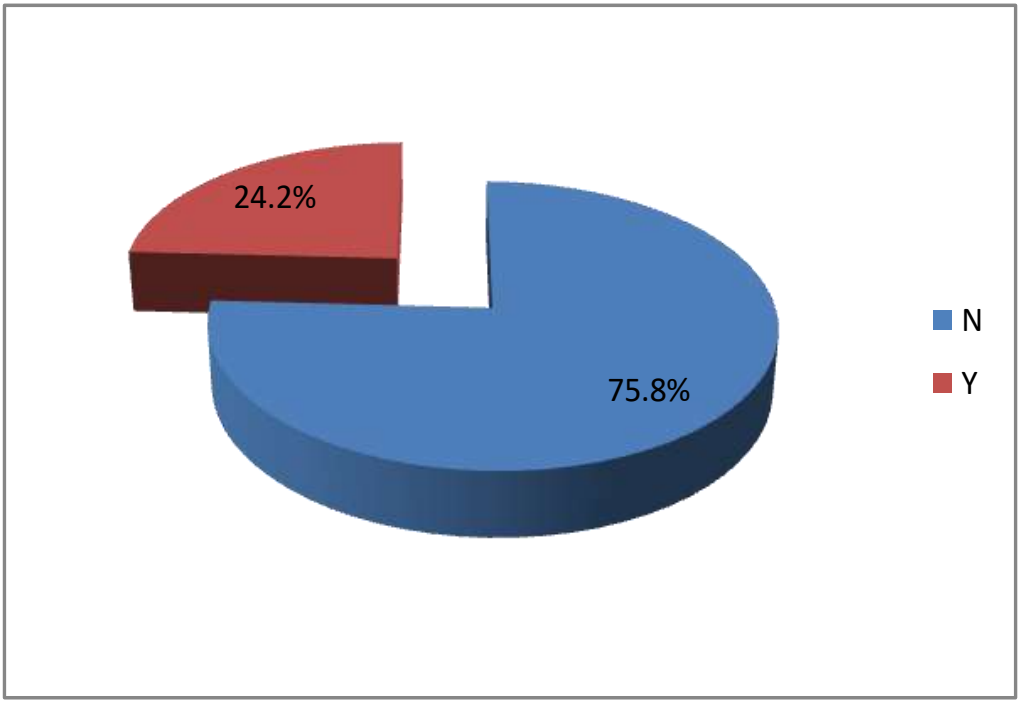


Table 18: Effect of stubble burning on poor control of asthma

stubble burning/fumes exposure	No. of cases	Percentage
N	22	35.5%
Y	40	64.5%
Total	62	100.0%

In our study that it was observed that 40 (64.5 %) patient with poor control has exposure to stubble burning and fumes exposure but 22 (35.5 %) has no exposure to agarbatti and candles.

Figure 18: Effect of stubble burning on poor control of asthma

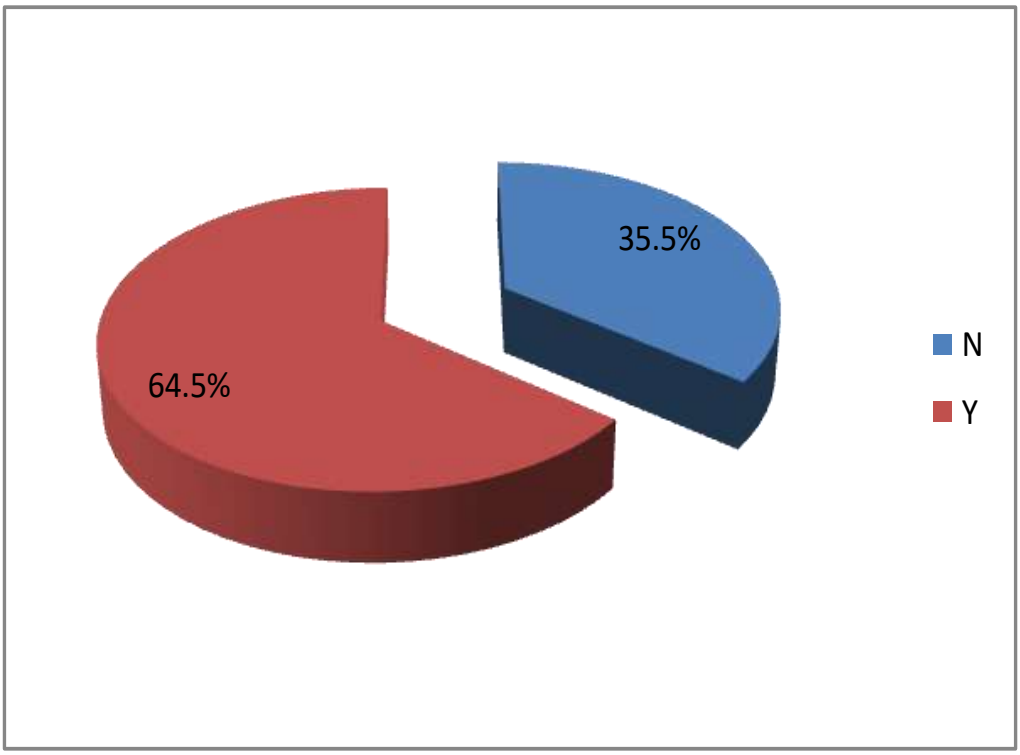
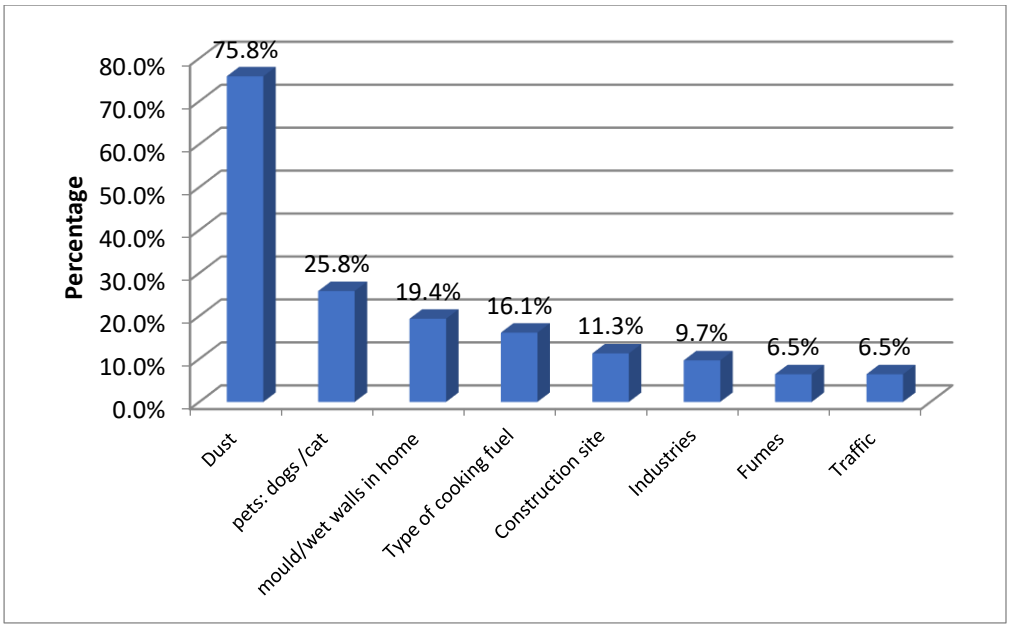


Table 19: List of various pollutants causing poor control of bronchial asthma

List of possible pollutants to be discussed	No. of cases	Percentage
Dust	47	75.8%
pets: dogs /cat	16	25.8%
mould/wet walls in home	12	19.4%
Type of cooking fuel	10	16.1%
Construction site	7	11.3%
Industries	6	9.7%
Fumes	4	6.5%
Traffic	4	6.5%

We observed that, dust was the most common pollutant found in 75.8% patients with poor control of asthma followed by pets (25.8%), moulds (19.4%), type of cooking fuel (16.1%), construction site (11.3%), industries (9.7%), fumes (6.5%) and traffic (6.5%).

Figure 19: List of various pollutants causing poor control of bronchial asthma



D) Treatment and technique

Table 20: Treatment adherence of patients

Measure of MDI Inhaled corticosteroid Adherence was the percentage of inhalations performed correctly between visits 1 and 2	No. of cases	Percentage
1	38	61.3%
2	6	9.7%
3	18	29.0%
Total	62	100.0%

We divided patients into three subgroups on the basis of drug doses taken by the patient

1 – Patients who had taken more than 80 % of the recommended doses of MDI.

2 – Patients who had taken 50-80% of the recommended doses of MDI

3 - Patients who had taken < 50 % of the recommended doses of MDI

In our study, 38 (61.3 %) patients with poor control had good adherence to treatment, 6 patients with poor control had intermediate adherence to treatment, 18 (29 %) patient had no adherence to treatment

Figure 20: Treatment adherence of patients

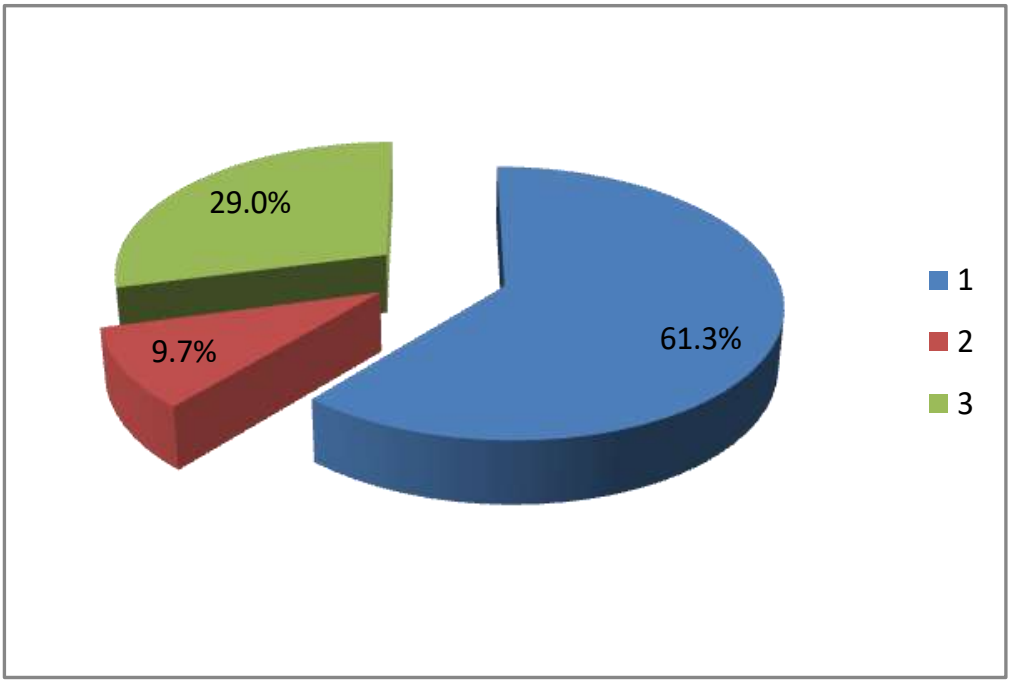


Table 21: Effect of inhaler device technique check list

Inhaler device Technique check list	No. of cases	Percentage
1	42	67.7%
2	20	32.3%
Total	62	100.0%

We divided patients into two subgroup on the basis of usage of inhaler technique

1- Good technique
2- Poor Technique

In our study, Out of 62 patients, 42 (67.7 %) patients with poor control had good inhaler technique where as 20 (32.3 %) patients with poor control had poor inhaler technique.

Figure 21: Effect of inhaler device technique check list

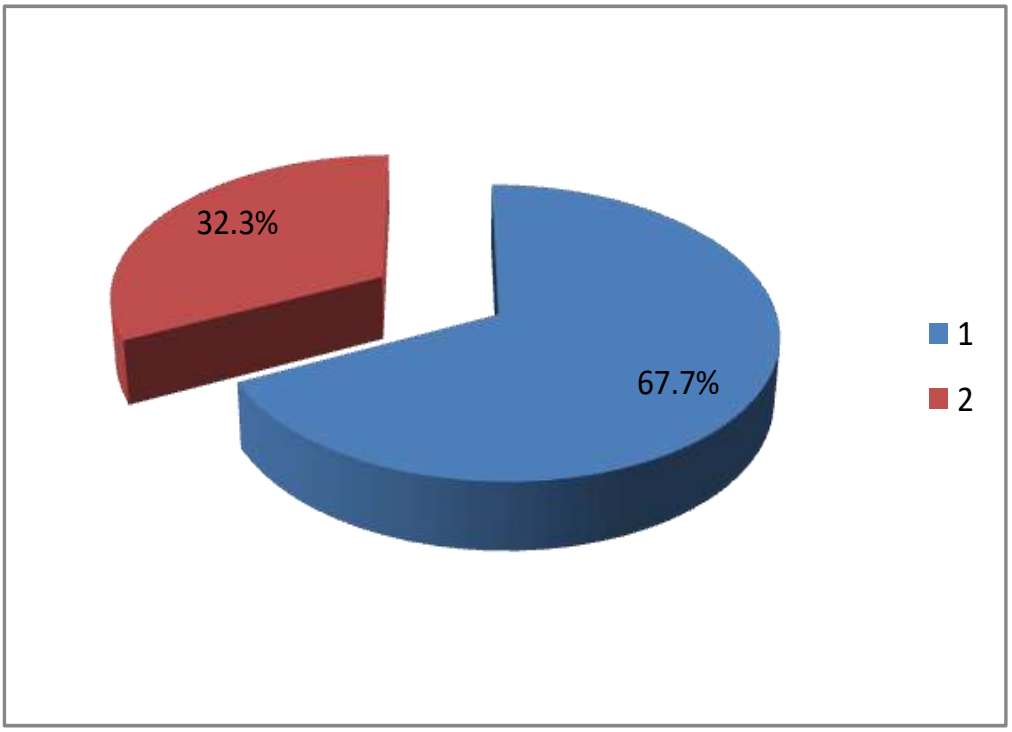


Table 22: Comparison of inhaler technique indifferent age group

		Age group				Total	Chi-square value	p-value
		< 11		> 11				
Inhaler device Technique check list	1	42	89.4%	15	100.0%	57		
	2	5	10.6%	0	0.0%	5		
Total		47	100.0%	15	100.0%	62	1.736	0.188

We divided patients into two subgroups on the basis of usage of inhaler technique

1- Good technique
2- Poor Technique

It was found in our study that all children belonging to the age group of more than 11 years were using good technique of inhalers. Out of 47 patients belonging to the age group of 4 to 11 years, 42 (89.4%) were using good technique and 5 (10.6%) were using poor technique.

Figure 22: Comparison of treatment adherence in different age group

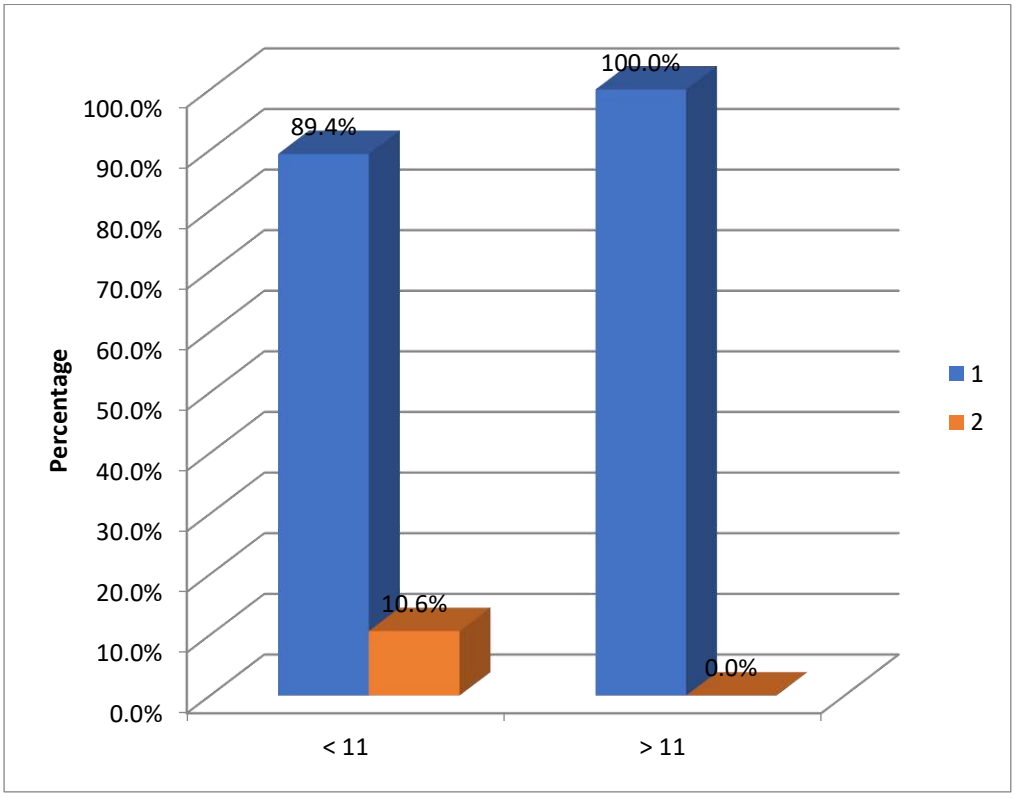


Table 23: Comparison of treatment adherence in different age group

		Age group				Total	Chi-square value	p-value
		< 11		> 11				
Measure of MDI Inhaled corticosteroid Adherence was the percentage of inhalations performed correctly between visits 1 and 2	1	31	66.0%	7	46.7%	38		
	2	3	6.4%	3	20.0%	6		
	3	13	27.7%	5	33.3%	18		
Total		47	100.0%	15	100.0%	62	2.995	0.224

We divided patients into three subgroups on the basis of drug doses taken by the patient

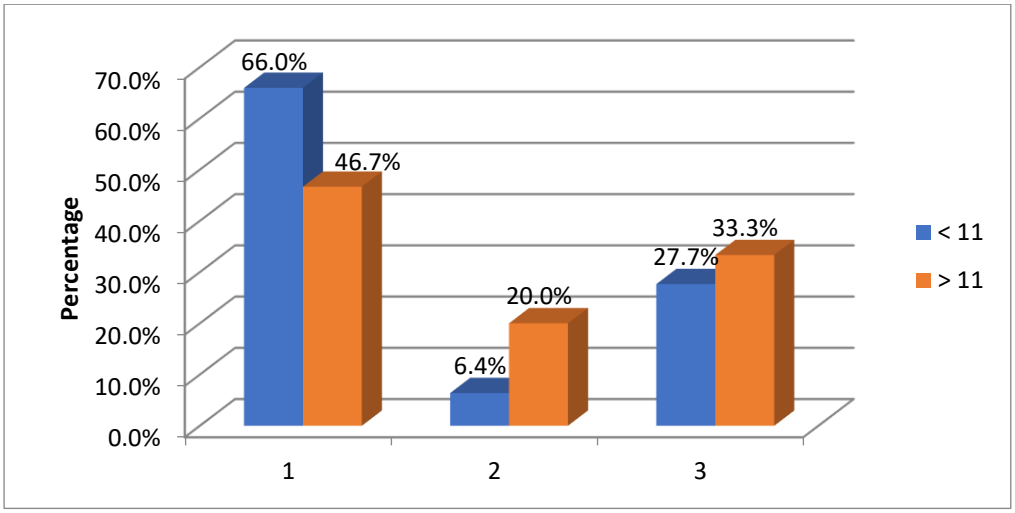
1 – Patients who had taken more than 80 % of the recommended doses of MDI.

2 – Patients who had taken 50-80% of the recommended doses of MDI

3 - Patients who had taken < 50 % of the recommended doses of MDI

We observed that out of 15 children with age more than 11 years, 7 (46.7%) had good adherence to treatment followed by 5 (33.3%) patients had bad adherence and 3 (20%) patients had intermediate adherence. Out of 47 patients in the age group of 4 to 11 years, 31 (66%) had good, 13 (27.7%) had bad and 3 (6.4%) had intermediate adherence.

Figure 23: Comparison of treatment adherence in different age group



E) Morbidity due to poor control of asthma

Table 24: Limitations in sports, play and daily activites

Limitations in sports, play and daily activites	No. of cases	Percentage
N	13	21.0%
Y	49	79.0%
Total	62	100.0%

In our study ,49 (79 %) patient had limitations in sports, play and daily activities whereas 13 (21%) patients

Figure 24: Limitations in sports, play and daily activities.

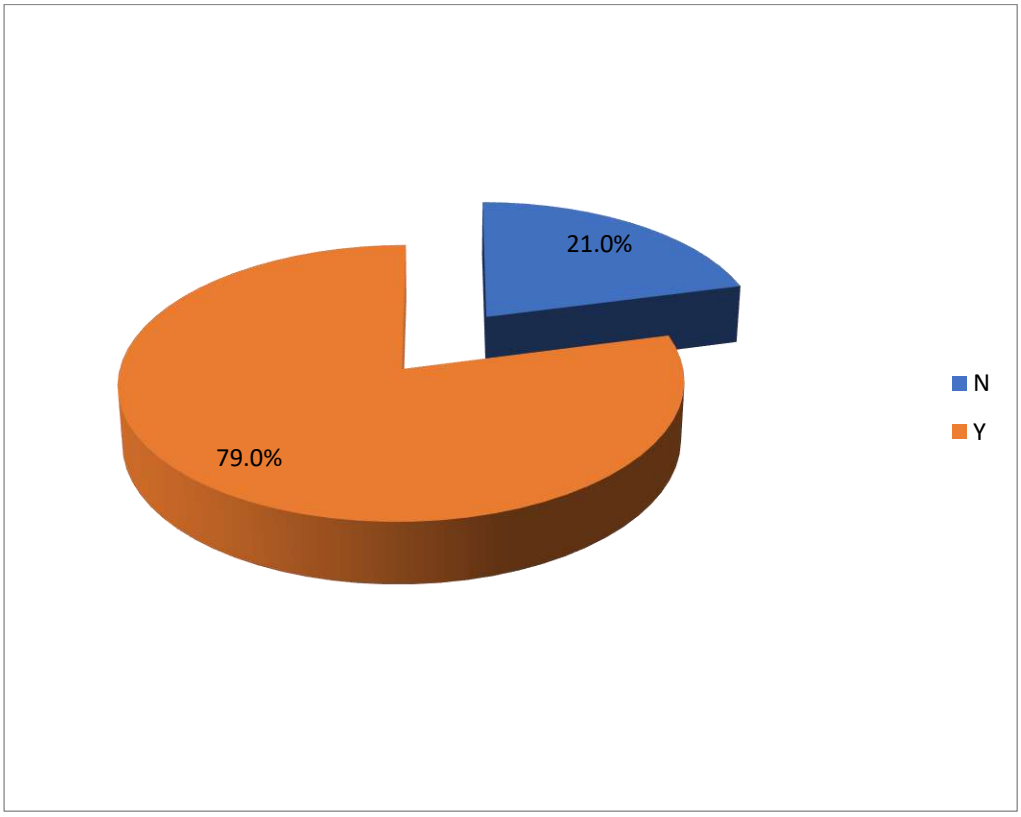


Table 25: School Absenteeism

School Absenteeism	No. of cases	Percentage
N	25	40.3%
Y	37	59.7%
Total	62	100.0%

In our study it was noted that poor control is responsible for School Absenteeism It was seen that 37 (59.7%) patients were absent from school and 25 (40.3%) patients were regular to school.

Figure 25: School Absenteeism

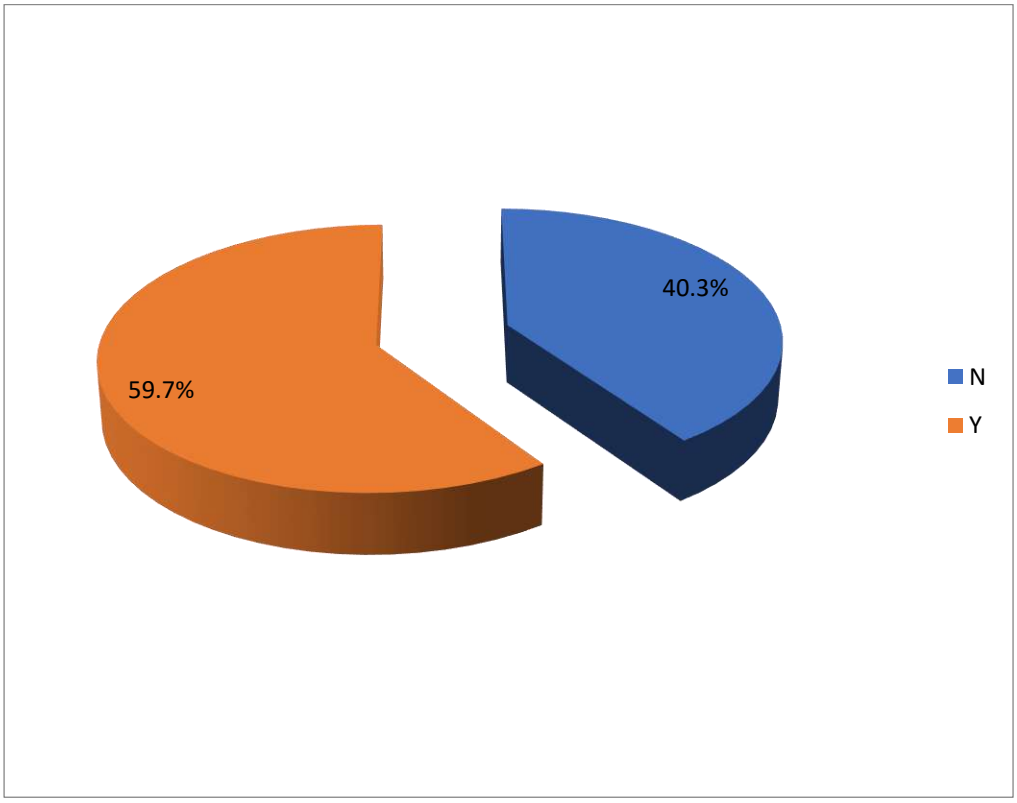


Table 26: Parents absenteeism

Parents absenteeism	No. of cases	Percentage
N	28	45.2%
Y	34	54.8%
Total	62	100.0%

It was observed that 34 (54.8 %) patients with poor control had parents absenteeism from their workplaces and 28(45.2 %) parents had no absenteeism from workplace

Figure 26: Parents absenteeism

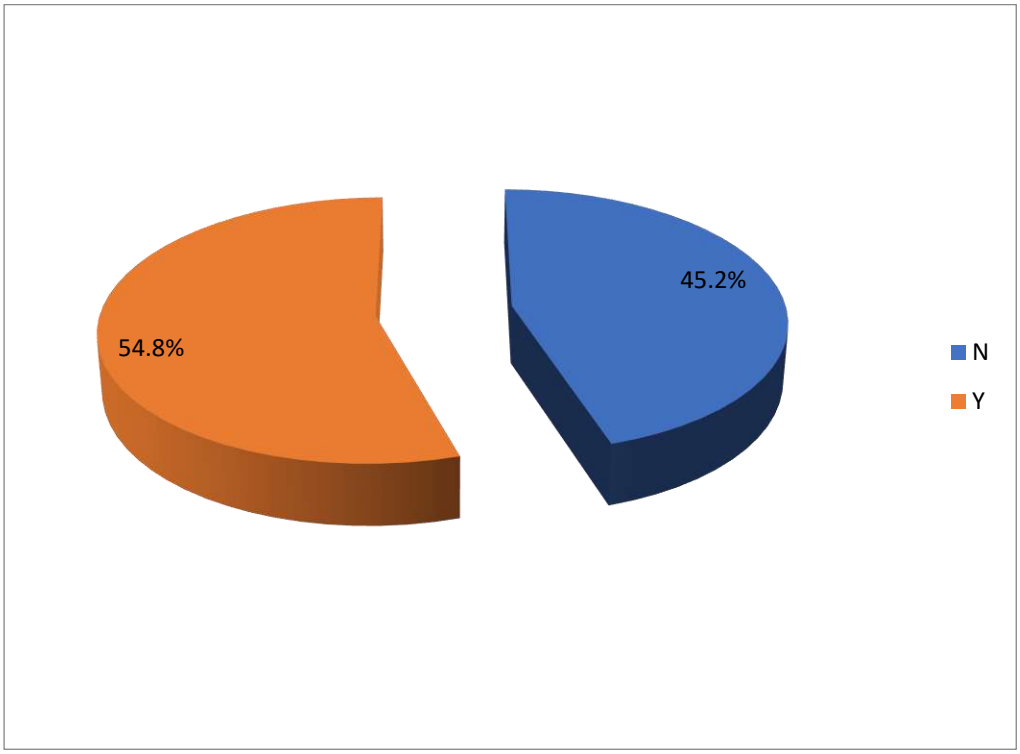
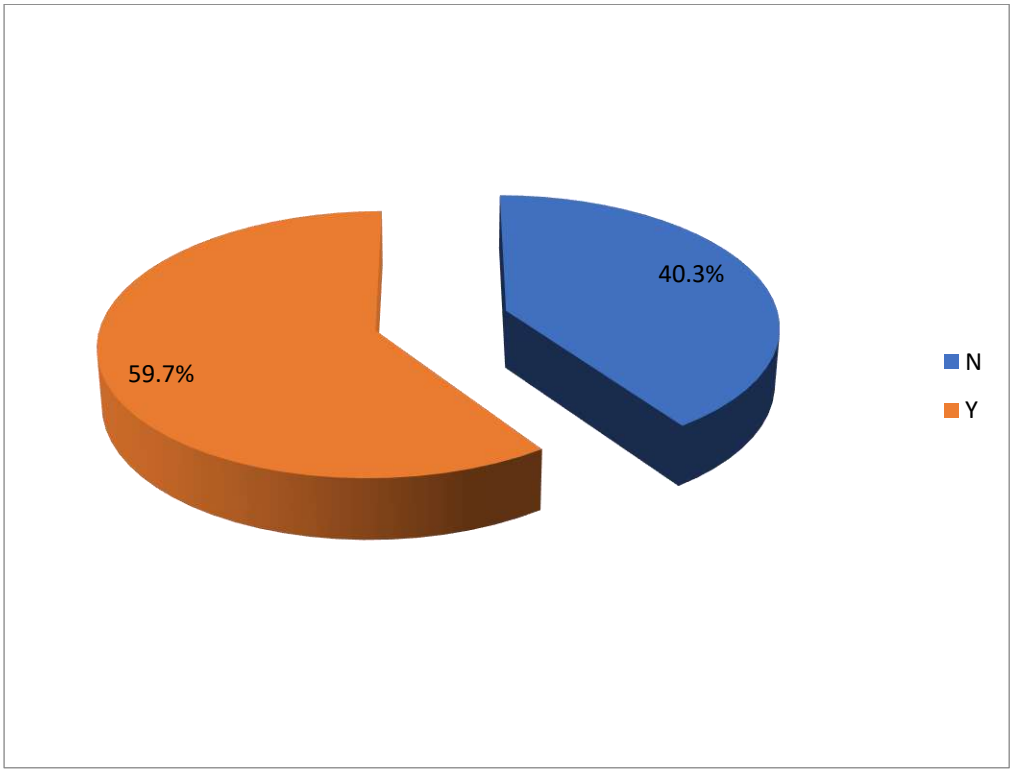


Table 27: Impact on sleep

Impact on sleep	No. of cases	Percentage
N	25	40.3%
Y	37	59.7%
Total	62	100.0%

It was found that 37 (59.7%) patients had disturbed sleep and 25(40.3%) patients had normal sleep.

Figure 27: Impact on sleep



DISCUSSION

Asthma is a chronic inflammatory disease of the airways characterised by airway hyper-reactivity and reversible obstruction. It is a complex chronic lung disease , characterised by shortness of breath, coughing, bronchospasm, and wheezing sound, caused by obstructed airway and hyperresponsiveness. Asthma can affect a child of any age group , but it most often affects children as their immune system is still developing. Most children who have asthma have presents with initial symptoms by the age of 5 years. The prevalence is rising in many countries making it one of the most important global health issues. Asthma has a high burden of disability, particularly among children and older adults. It is ranked as the 14th most important disease worldwide in terms of years lived with disability and has been identified as the most common cause of hospitalisation in children.

Asthma is the one of the most common chronic disease of childhood with increasing incidence worldwide. As per WHO, 350 million people around the world suffer from asthma of which ten per cent are in India.The prevalence of asthma in children is estimated to be 6.2 to 6.8 % in the age group of 6 to 7 years and 6.4 to 6.7 % in age group of 13 to 14 years with males more afftected than females[52] . The burden of asthma is rising in view of rapid urbanization, changing life style and poor air-quality. The presence of asthma is associated with a significant socioeconomic burden due to both direct (such as hospital care, OPD visits, and medications) and indirect costs (such as absence of parents from work area and premature death of the child). The aim of asthma management is to achieve proper control of symptoms, thereby providing a good quality of life .Despite standard guidelines for management and effective medication, poor asthma control is a significant problem throughout the world.

Childhood asthma isn't a different disease from asthma in adults, but children face unique challenges. The condition is a leading cause of emergency department visits, hospitalizations and missed school days.

Unfortunately, childhood asthma can't be cured in many and symptoms can continue into adulthood.

The causes of asthma are complex but generally considered to involve interaction between host factors, mainly genetics, and environmental factors. For example, exposure to second hand smoke was confirmed as a risk factor for asthma but also other factors like obesity, sedentary behaviour, preterm birth, low birth weight and viral infections in infancy have been associated with increased odds of developing asthma.[53]

The aim of asthma management is to achieve proper control of symptoms, thereby providing a good quality of life. A number of studies in adults tried to identify the factors associated with partially or uncontrolled asthma. There are modifiable and non-modifiable factors influencing control. The foremost step in asthma management is identification and removal/modification of those risk factors. Although there are many causes to poor control in children but studies in relation to various factors leading to poor control are lacking .[32]

Identification of preventable risk factors is of paramount importance to guide public. Classic symptoms of asthma include cough, wheezing, chest tightness, and shortness of breath. Symptoms are often episodi, worsen at night and can get triggered by numerous factors, including upper respiratory tract infections, exercise, exposure to allergens, and airway irritants such as tobacco smoke.

There is no known cure for asthma however, pharmacological intervention has been shown to significantly improve symptoms **.** The use of inhaled corticosteroids, long acting β_2-agonists and a combination of these medications have been shown to improve asthma control but compliance rates of >80% are required to maintain this level of control . Unfortunately, compliance to asthma treatment in countries where treatment is readily accessible remains poor.[54]

Asthma control is determined by the frequency of daytime symptoms, limitation of activities, nocturnal symptoms, need for reliever medication, lung function and exacerbations. Accordingly, patients are classified as having controlled, partially controlled or uncontrolled asthma.. Poor

asthma control has been associated with more emergency room visits, physician visits and days spent in hospital.[55]

The present study was done to identify the factors responsible for poor control of bronchial asthma in children aged between 4 to 18 years at Dayanand Medical college & Hospital , Ludhiana . Sixty two patients with poor control of bronchial asthma fulfilling the inclusion criteria, were enrolled in the study.

A) Demographic profile of children with bronchial asthma

- **Area wise distribution:**

In our study out of 62 patients ,36 patients (58.1%) belonged to urban areas and 26 patients (41.9 %) were from rural areas.

C Andrew Algine et al.[56] did a study on risk factors for poor control in asthma and concluded that urban children have more risk for poor control than non urban people regardless of family income

Dr R.M Thanisulas [57] et al. concluded in his study that there were significantly more urban residents than in rural area in poorly controlled group, 73.1% of the poorly controlled children were residing in urban area.

In one study done by Valet et al. [58] it was found that rural children had more asthma attacks than urban children . Automobile emission and overcrowding could be possible reasons for poor control of bronchial asthma.

- **Overcrowding status:**

Majority of children with poor control of asthma belonged to crowded areas which comprised of 46 patients (74.2%) out of total 62 patients enrolled in the study as compared to the 16 patients(12.5%) in noncrowded regions .

Dr M Thanisulas [57] et al. did a study in which 12.5% of the children in well controlled group and 13.75% of the children in poorly controlled group were residing in overcrowded house. Though there were more number of children in poorly controlled group with overcrowding, this finding was not statistically significant with p value 0.423.

In Bankole Peter Kuti[35] et al . study, 26.3% of the children in poorly controlled group resided in overcrowded area which was higher than well controlled group, though the difference was not statistically significant .

- **Socioecomic status:**

Socioeconomic status has a great impact on the control of asthma. It is noted in our study that 55 patients (88.7 %) belonged to upper middle class, 6 (9.7 %) belonged to lower middle class and 4 (1 %) were belonged to upper lower class.

It is in contrary to study done by C Andrew Aligne [56] et al on risk factors for paediatric population in which it was noted that poverty has no impact on control in urban and non-urban population .

Bloomberg et al [41] found out that low socioeconomic class was an important risk factor for poor control of asthma in a study done in American population This discrepancy in our study with other studies is because our hospital is a private setup and most of the patients coming to chest clinic belong to upper middle class.

B) Clinical Profile of Patients:

- **Age wise distribution:**

Current study included diagnosed cases of poor control of bronchial asthma between 4 to 18 yrs of age . These children were divided into two groups i.e 4 to 11 years of age and more than 11 years of age. Among 62 patients, 47 (75.8 %) were between 4 to 11 years of age group and 15 (24.2 %) patients were more than 11 years of age group . Mean age for study is 8.9 ±2.58 years.

Bankole Peter Kuti et al. [35] did a similar study on 110 patients evaluating risk factors associated with poor control of asthma in the age group of 3 to 15 yrs of age and found the mean age 10.3 ± 2.7 years in their study subjects .

In another study done by SL Mc Ghan et al[59] the mean age of the children included in the study was 9 years.

- **Gender wise distribution:**

It was noted that the majority of patients were male (45) as compared to female population (17) which constituted (72.6 %) of the total enrolled children. Male to female ratio was 2.6 1. Possibilty of gender bias which persists in developing countries could be one of the reason for male predominance.

Peters et al [60] identified female sex as risk factor for uncontrolled asthma in his study .

Dr R M Thanisulas [57] et al did a study in which it was seen that 60% were male children in well controlled and 46.9% were male children in poorly controlled group . Female gender is a risk factor for poor control as p value of 0.013 makes it significant.

- **Effect of gestation on poor control of asthma:**

As prematurity interrupts the lung development , a study done by Jie Zhang [61] found that children who were born preterm were 1.64 times more likely to develop asthma compared to those who were born at term gestation . Instead of prematurity, low birth weight was taken as a risk factor for poor control of asthma in our study but the result came out to be non-significant which is similar to our study .We observed that 93.5 % [58] patients with poor control of asthma had term gestation at birth but 6.5 % (4) patient had preterm gestation at birth.

- **Effect of exclusive breast feeding on poor control of asthma :**

It is well known that breastfeeding has an important role in reducing the risk of developing asthma in early childhood. It is seen that 51 (82.23 %) patients with poor control had exclusive breast feeding and 11 (17.7 %) patients did not have exclusive breast feeding. Xiaona Huo et all found that risk for childhood asthma is decreased if the child is exclusively breastfed [62]

Hye-Young Kim [63] concluded in the study that persistent bedtime bottle feeding has a detrimental effect on chronic respiratory symptoms in infants, which is in agreement with a previous report by Celedón et al. Meghan B. Azad.

- **Effect of comorbidities on poor control of asthma:**

It was noted in our study that comorbities were associated with poor control of asthma. It was seen that 51 (82.3 %) patients had allergic rhinitis and 1 (1.6%) patient had adenoids .

Dr M Thanisulas et al[57] found that 21.25% of the study subject in well controlled group and 66.25% of the poorly controlled group were associated with co morbidities. There are significantly more patients with co-morbidities in poorly controlled group. This finding was found significant with the p value of <0.001. Allergic rhinitis, atopic dermatitis, conjunctivitis, rhinitis and tonsillitis, rhino-conjunctivitis were the associated co-morbidities noted in this study. They found that allergic rhinitis was present in 46.25% of the cases with poor control, which is similar to findings in the study done by Amujuri Krishna[33] et al 15 where 57.16% of cases with poor control of asthma had allergic rhinitis.

A study done by Desalu OO et al. [64] reported the prevalence of allergic rhinitis in patients with poorly controlled asthma as 31.3%. Kinchoku VM et al.[65] reported very high prevalence (95.6%) of allergic rhinitis in children with poorly controlled asthma.

C) Risk factors responsible for poor control of asthma (various allergens and pollutants):

- **Effect of season on poor control of bronchial asthma:**

Seasonal variations causes asthma exacerbations which corresponds to poor control during childhood. In our study the most triggering season was start of October which is the beginning of winter season which had an effect on 48 (77.4 %) patients , followed by summer season having effect on 21 (66.1%)patients and least affecting monsoon season in 8 (12.9 %) patients only .

A study conducted by Julia A Wisniewski et al [66] in children aged 6–10 years noted that there were 301 visits to the ED due to exacerbation of asthma. It was found that 40% of admission occurred during the fall (September–November). The mean number of monthly visits to the emergency department for asthma from September to November (in the fall) was significantly higher than the mean number of monthly visits from

December to February (winter), March through May (spring), and June through August (summer), $p < 0.001$, $p = 0.016$, and $p < 0.001$, respectively . Sumair Anwar et al [67] Similar results as our results due to seasonal factors were seen in a study done by Sumair Anwar et al. who had more number of cases in months of July to December, corresponding with relatively high humidity and lowering temperature.

- **Effects of emotions (laughing/crying) on poor control of asthma:**

It is well known that intense laughing and crying is a form of exercise which causes hyperventilation and stimulates asthma Many studies on asthma report laughter is a common trigger for people with asthma.

Liangas G et al[68] found that 44 (41.9%) patients reported laughter-associated asthma out of total 105 subjects participating in the study . It was found that exercise and laughter were strongly associated as triggers ($p < 0.006$). In our study it was noted that 9 (14.5 %) patients were the ones whose emotions (laughing and crying) have effect on poor control of asthma where as emotions in 53 (85.5%) patients had no effect on poor control of asthma. It could be due to decreased population. A number of studies in adults have studied the effect of emotion in asthma but not much studies have been done in children.

- **Effect of pollen on poor control of asthma:**

Avoidance of the allergen is key but this may not be always possible.In our study , exposure of pollen was present in 6.5% [4] patients with poor control of bronchial asthma where as 93.5 % [58] had no exposure of pollens However, pollen counts tend to be highest in the early morning and early evening, so minimising the time spent outdoors during this time of the day may help to reduce the impact of allergens on nasal symptoms and asthma.

In a study conducted by Ratchadaporn Papwijitsil[69] et al. it was concluded that in poor control asthma 45.5 % patient had exposure to pollen where as in controlled group 56 % patient had exposure to pollen making it a non significant factor for poor control.

- **Effect of food (soft drink) on poor control of asthma:**

Soft drinks or carbonated beverages are a popular component of the current dietary lifestyle both in developed and developing countries. As per our study, intake of soft drinks (food) was present in 38.7 %[24] patients with poor control of asthma .

Amna Al Ibrahim et al[70] found that soft drink consumption was positively associated with asthma among Qatari adults. There was a significant association between diet soft drink consumption and asthma. Regular soft drink consumption was associated with decreased FEV1. No association between fruit juice and asthma was found in our study.

- **Effect of exercise on poor control of asthma:**

Asthmatic patients may often purposely avoid exercise and adopt a sedentary lifestyle. It is commonly thought that physical activity provokes asthma-related symptoms reflecting the nature or insufficient control of asthma. Accordingly, the Global Initiative for Asthma (GINA) recommends people with asthma to engage in regular physical activity in order to improve their general health. It was noted in our study that 17 patients (27.4%) patient had exacerbation of bronchial asthma with exercise and 45 patients (72.6 %) patients did not exacerbation with asthma.

Fanelli et al. [71] conducted a 16-week exercise program in children with asthma, for which the children exercised for 90 min twice per week. They showed significant improvements in aerobic fitness, improvement in quality of life and reduction in medication use.

- **Effect of repeated viral infections on poor control of asthma:**

In our study 22 (35.5%) patients had poor control due to repeated viral infections that acts as trigger. It is well known that viral infections, particularly with rhinovirus (RV) or respiratory syncytial virus (RSV), are important risk factors for wheezing episodes, asthma, and asthma exacerbations.

Denlinger et al.[72] assessed the respiratory viral load and strain in a high-risk asthma cohort during a natural cold. The study discovered that patients are more prone to develop exacerbations if their secretions were still virus positive. Exacerbations were higher among RV-infected

patients who had a high sputum neutrophil count. Viral infections in infancy, particularly with rhinovirus (RV) or respiratory syncytial virus (RSV), are important risk factors for wheezing episodes, asthma, and asthma exacerbations.

- **Effect of agarbati candles on poor control of asthma:**

Agarbatti smoke contains carbon monoxide (CO),Carbon dioxide (CO_2), (NO_2), (SO_2),which when inhaled causes allergic response in the airways and leads to various respiratory symptoms. As Punjab is a religious state, people have habit of inciting agarbatti at homes which is responsible for poor control of asthma .In our study it was noted that 27 (43.5 %) patient with poor control had exposure to agarbatti and candles but 35 (56.5 %) has no exposure to to agarbatti and candles.

it was found in a study that use of 'Bakhour '(Arbian incense) more than twice a week was three times more likely to affect breathing of child compared to no bakhour use (adjusted OR 3.01; 95% CI 2.23-4.08) and the intensity of this effect was 2.55 times higher in asthmatics [73] (adjusted OR 2.55; 95% CI 1.97-3.31) compared to non-asthmatics. Dr M Thanisulas et al found that usage of agarbatti was found in 62 children in well controlled group and 115 children in poorly controlled group which was statistically significant[57].

- **Effects of mosquito coils on poor control of asthma:**

Burning one mosquito coil is equivalent to smoking a hundred cigarettes. In our study, 15 (24.2 %) patients with poor control had exposure to mosquitoes coils and 47 (75.8 %) has no exposure to mosquitoes coils . B H azizi [74]found in his study that exposure to mosquito coil smoke at least three nights in a week was associated with increased risk for asthma.

- **Effect of stubble burning on poor control of asthma:**

Johnston et al [75] conducted a time-series ecological study in Darwin, Australia during a bushfire (7 months) in 2000, and showed a significant increase in hospital admissions of asthma owing to increases in PM_{10} concentrations. Christine Rulten et al [76] found a fall in hospital admission due to asthma in Craighead County, Arkansas in the year

2014-2016 due to absence of crop burning which is similar to our study, in which study it was seen that 40 (64.5 %) patients with poor control had exposure to stubble burning and fumes exposure and 22 (35.5%) had no exposure to stubble burning .

- **Effect of smoking on poor control of asthma:**

Passive smoking is a major cause of respiratory morbidity, and is associated with increased bronchial responsiveness in children. In our study it was seen that 7 (11.3 %) patients with poor control had exposure to smoking and rest 55 (88.7 %)patients had no exposure to smoking which is in agreement to study done by Ratchadaporn Papwijitsil [69] et al who found no significant association of smoking with poor control of asthma ,as p value 0.42.

Indoor combustion sources and fossil fuels besides room fresheners and perfumes too can trigger the respiratory disorder especially among kids. The toxic fumes from these products provoke an allergic reaction and start off a cascade of inflammatory events that result in the narrowing of the already hyper-reactive airways resulting in cough and breathing problems. Children are more prone as their respiratory system is not fully grown. Various pollutants are responsible for poor control of asthma. In our study dust WAS the major common pollutant in poor control of asthma followed by pets and moulds.

Ratchadaporn Papwijitsil et al [69] found that 17/55 (30.9%) houses were surrounded by industry in the controlled group where as 12/55 (21.8%) houses were surrounded by industry in uncontrolled group.

In study conducted by Ratchadaporn Papwijitsil [69] in controlled asthma he found that 14/55 (25.5%) patients had pets at home in controlled group and 21/55 (38.2%) patients had pets at home in the uncontrolled group ,which is in contrast to our study where out of 62 uncontrolled asthma patients 16 (25.8%) patients had pets at home .

Amujuri Krishna [3] et alfound that 25.49% patients in well controlled have pets and 40.8% patients in poor controlled have pets and and p value is 0.103 making it statically insignificant .

Dr M Thanisulas [57] et al found that type of fuel usage did not affect control in the study.

In the study conducted by Bankole Peter Kuti et al [35] 95.1% patients in well controlled and 89.3% in poorly controlled group used LPG as fuel which was statistically not significant. In our study, 18 (29%) patients used wood coal and kerosene .

D) Treatment adherence and Inhaler Technique check list:

- **Treatment adherence:**

In our study, it was found that 38 (61.3 %) patient with poor control had good adherence to treatment (who took medication doses more than 80 %), 6 patients with poor control had intermediate adherence to treatment (who took medications 50%to 80%), 18 (29 %) patient had no adherence to treatment(less than 50 percent) .

Dr M. Thanisulas [57] et al found that 100% treatment adherence was noted in well controlled group in his study Only 59.37% of the study subjects were adherent to the treatment in the poorly controlled group. This finding was significant with p value<0.001.

In a systematic review done by Marjolein Engelkes et al [77] showed that nonadherence is associated with poor asthma control.

Another study done by Williams etal 45 showed 24% asthma exacerbations in patients with non-adherence to inhaled corticosteroids (ICS).[20]

Non adherence to treatment due to fear of side effects was noted in 42.8% of cases in the poorly controlled group and 33.33% of the cases in the well controlled group in the study by Amujuri Krishna et al15. These low adherence rates have been attributed to safety concerns about inhaled corticosteroids (ICS) (“steroid phobia”) by both the patients and the caregivers [33].

- **Effect of inhaler device technique check list:**

In our study, out of 62 patients, 42 (67.7 %) patients with poor control had good inhaler technique where as 20 (32.3 %) patients with poor control had poor inhaler technique.

Dr M. Thanisulas [57] observed that the 2.5% of children in the wellcontrolled group and 18.12% of children in the poorly controlled group had wrong technique of usage of inhaler. This finding was

significant with the p value of <0.001. This finding highlights the need for investing more time with parents when starting inhalers for the first time in any child with asthma. In the study by Amujuri Krishna[33] et al15 difficulty with devices usage was present in 67.34% cases with poor control of asthma, with p value of 0.015. Other studies like Hinchageri et al[33] and Gaude GS et al have reported difficulty with devices in 43.5% and 12% respectively.

E) Morbidity of poor control of asthma :

- Limitations in sports, play and daily activites. Playing sports can help children stay fit and maintain a healthy weight. In our study, 49(79 %) patient has limitations in sports ,play and daily activities whereas 13(21%) patients had no problems in sports , play and daily activities . Mariana Rodrigues Gazzotti [78] did as study in brazil among adults and found that people having uncontrolled asthma had more sleep disturbances sleep, daily activities and daily normal physical exertion. ($p < 0.001$).
- Absent from school. In our study it was noted that poor control is responsible for school absenteeism. It was seen that 37 (59.7 %) patients were absent from school and 25 (40.3 %) patients were regular to school . Joy Hsu, [79] et al did a study in which children absenteeism from school was noted. it was seen that it occurred due to poorly controlled and not well controlled asthma (prevalence ratio: 1.50; 95% CI: 1.34–1.69)
- Absent from work Poor control is responsible for parents absenteeism . It was noted that 34 (54.8 %)patient with poor control had parents absenteeism from their workplaces and 28(45.2 %) parents had no absenteeism from workplace .Mariana Rodrigues Gazzotti, [80] at al did a study in brazil among adults and concluded that poor controls of asthma affects the daily activities of the patients . Among the 400 patient enrolled, it was noted that asthma was controlled in 37 (9.3%), partially controlled in 226 (56.5%), and uncontrolled in 137 (34.2%). The numbers of patients with uncontrolled or partially controlled asthma who visited the emergency room, who were hospitalized, and

who missed school/work were higher than were those of patients with controlled asthma ($p = 0.001$, $p = 0.05$, and $p = 0.01$, respectively).

- Impact on sleep In our study it was noted that poor control is responsible for disturbed sleep.It was seen that 37 (59.7%) patients and 25(40.3%) patients were regular to school. Tammam M. Alanazi[78] et al did a study on sleep disturbances among asthmatic patients. it was concluded that majority of the patients (66%) suffered from poor sleep quality. Almost half of the patients (43%) had a high risk of obstructive sleep apnea ,25% had excessive daytime sleepiness (ESS > 10), and 46.5% had significant clinical insomnia (ISI ≥ 10).

SUMMARY AND CONCLUSIONS

It was a prospective study done over a period of one and half year in paediatric chest clinic O.P. D in Dayanand Medical College and Hospital, Ludhiana, Punjab. All Children between 4-18 years of age with poor control of bronchial asthma , attending chest clinic who had received atleast two months of controller therapy were included. Poor control is defined as the score less than 19 in childhood asthma score and asthma control test. Study was approved by the institutional ethic committee. Sixty two patients were enrolled in the study.

Majority of children 36 (58.1 %) belonged to urban area as compared to 26 (41.9 %) from rural areas.

- Majority of children (46/62) (74.2%) with poor control of asthma belonged to crowded areas but only 16 (25.8%) patients were from non crowded areas.
- According to kuppuswamy scale 2017, 55/62 (88.7 %) patients were from upper middle class, 6 (9.7 %) were from lower middle class and only 1 (1.6 %) was from upper lower class.
- Majority of the children (75.8 %) belonged to the age group of 4 to 11 years and (24.2 %) patients were from the age group of more than 11 years
- Mean age for study is 8.9 years. Standard deviation for study was 2.58
- There were more males (72.6 %) as compared to females (27.4 %) male to female ratio of 2.64
- Majority of the children (93.5 %) were born at term at birth and (6.5%) children were born preterm .
- Exclusive breast feeding was done in 82.23 % patient with poor control during infancy.
- More frequent episodes of discomfort was seen in (77.4%) winter season followed by summer season (33.9%)
- Majority of patients (85.5%) had no association of emotions(laughter and crying). With poor control of asthma
- Ninety three percent patient with poor control of asthma had no

exposure of pollens.

- Repeated viral infections were present only in 35.5 % children.
- Majority of children (56.5 %) with poor control of asthma had no exposure to agarbatti and candles
- Mosquito coil exposure was present only in 24.2% children with poor control of asthma.
- Stubble burning and fume exposure is an important pollutants that trigger asthma. In our study, majority of the children (64.5 %) had exposure to both.
- Exposure to passive smoking was seen in only 11.3% children.
- Dust was the most common pollutant found in 75.8% patients with poor control of asthma followed by pets (25.8%), moulds (19.4%), type of cooking fuel (16.1%), construction site (11.3%), industries (9.7%), fumes (6.5%) and traffic (6.5%).
- It was noted that in children younger than 11 years poor technique was observed in compared to older children.
- Poor adherence to treatment was noted in children more than 11 years of age as compared to younger age group.
- Majority of the patients (79 %) has limitations in sports, play and daily activities.
- Poor control of asthma is responsible for school absenteeism and it was found in 59.7 % children in our study .
- More than half (54.8%) of the parents of children with poor control had absenteeism from work.
- More than half of children (59.7 %) has disturbed sleep due to poor control .

Conclusion

In our study done on children presenting with poor control of asthma , it was noted that faulty technique in younger children (4 to 11 yr) and poor adherence in older children is an important cause of uncontrolled asthma. Uncontrolled asthma even after therapy was more in children who belonged to urban areas and exposure to various allergens like pollution, dust and traffic. All the factors leading to poor control of asthma

cannot be modified like change of season, area , socioeconomic status. This study highlighted the modifiable factors like correct technique , more counselling session regarding the technique and adherence to treatment along with avoidance of known triggers to improve the quality of life in children with asthma . Poor control of asthma leads to poor quality of life in children due to school absenteeism and inability to play. In addition to that, it also had great impact on parents socially, mentally and economically. Therefore, it is important to know the factors responsible for poor control of asthma despite the initiation of preventor therapy (inhaled corticosteroids).

Limitations:

We acknowledge certain limitations of our study.

- This study was done in a tertiary care teaching hospital in the city, so the sample analysed may not be the representative of the entire population in the state.
- We do not have a control group to compare our data with uncontrolled group.
- The relatively small size of the sample population might have resulted in less precise estimation of the accuracy of the results.

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Sr. no	Mrd no.	Name	Age	Age group	Gender	Date of Birth	Locality	House environment	Occupation	Education	Monthly Income	Socioeconomic status	Kupuswammy scale	Overcrowding	Age at Diagnosis of Bronchial Asthma	Duration of Bronchial Asthma	Severity of Bronchial Asthma	Intermittent	mild persistent	moderate persistent	severe persistent	On Treatment	Duration of Controller therapy
1	934745	MS	10	2	M	4-28-2010	1	3	6	6	4	16	2	Y	5	5	2	Y	Y	Y	Y	Y	Y
2	1004593	KK	9	2	F	12-27-2011	2	1	8	7	10	25	2	Y	5	4	2	Y	Y	Y	Y	Y	Y
3	967918	HK	13	3	F	07-11-2007	2	3	6	5	6	17	2	Y	5	8	3	Y	Y	Y	Y	Y	Y
4	930891	HS	9	2	M	10-14-2012	2	3	6	5	10	21	2	Y	6	3	4	Y	Y	Y	Y	Y	Y
5	1001038	SS	8	2	M	9-17-2021	2	2	3	3	3	9	4	Y	3	5	3	Y	Y	Y	Y	Y	Y
6	1012023	SS	10	2	M	9-27-2010	2	1	6	5	6	17	2	Y	5	1	2	Y	Y	Y	Y	Y	Y
7	978832	AM	8	2	M	12-02-2012	2	1	6	5	5	16	2	Y	5	2	2	Y	Y	Y	Y	Y	Y
8	1007143	RK	5.4	1	M	9-14-2014	2	3	6	4	10	20	2	Y	5	0	2	Y	Y	Y	Y	Y	Y
9	988999	DM	6.5	2	F	05-12-2015	1	1	6	5	10	21	2	Y	5	1.5	3	Y	Y	Y	Y	Y	Y
10	1007803	S	8	2	F	06-08-2013	1	1	6	5	10	21	2	Y	6	2	1	Y	Y	Y	Y	Y	Y
11	968727	T	12	3	M	12-03-2008	1	3	6	5	10	21	2	Y	9	2	2	Y	Y	Y	Y	Y	Y
12	1054345	GK	8	2	F	7-27-2012	2	3	6	5	6	17	2	Y	6	2	3	Y	Y	Y	Y	Y	Y
13	1027876	V	13	3	M	11-04-2009	2	3	5	5	10	20	2	Y	6	4	1	Y	Y	Y	Y	Y	Y
14	934745	RK	10	2	M	12-30-2010	1	3	5	5	10	20	2	Y	9	1	1	Y	Y	Y	Y	Y	Y
15	930891	P	13	3	F	10-22-2007	2	1	9	6	10	25	2	Y	12	1	3	Y	Y	Y	Y	Y	Y
16	1026634	AK	7	2	F	01-03-2014	2	3	8	6	10	24	2	Y	7	0.4	1	Y	Y	Y	Y	Y	Y
17	1047635	MS	7	2	M	03-11-2015	2	3	5	5	10	20	2	Y	5	2	3	Y	Y	Y	Y	Y	Y
18	980697	AS	6	2	M	04-05-2015	1	3	9	6	10	25	2	Y	5	1	3	N	N	Y	N	N	N
19	986965	VP	9	2	M	11-27-2012	2	3	5	5	6	16	2	Y	5	4	2	Y	Y	Y	Y	Y	Y
20	1099577	RC	7	2	F	6-24-2014	1	3	6	5	10	21	2	Y	5	2	2	N	Y	N	N	N	N
21	1001038	Y	6	2	M	15-06-2015	2	1	5	5	6	11	3	Y	5	1	3	Y	Y	Y	Y	Y	Y
22	1083562	PS	10	2	M	1-20-2011	1	1	5	5	6	11	3	Y	8	2	3	Y	Y	Y	Y	Y	Y
23	988999	KS	5	1	M	5-15-2015	2	3	6	5	10	21	2	Y	5	0.3	1	Y	Y	Y	Y	Y	Y
24	408381	S	11	3	F	09-12-2010	1	3	6	5	10	21	2	Y	5	6	3	N	N	Y	N	N	N
25	999774	H	5	1	M	28-04-2016	2	3	6	5	8	19	2	Y	5	0.4	3	Y	Y	Y	Y	Y	Y
26	1027876	MS	11	3	M	08-02-2010	1	3	6	5	10	21	2	Y	5	3	3	Y	Y	Y	Y	Y	Y
27	1007803	HK	14	3	F	07-11-2007	2	3	6	5	8	19	2	Y	13	1	2	Y	Y	Y	Y	Y	Y
28	1054345	SS	11	3	M	05-05-2007	2	3	5	6	8	19	2	Y	5	7	2	Y	Y	Y	Y	Y	Y
29	1007803	SK	16	3	F	8-22-2005	2	3	6	5	10	21	2	Y	13	3	1	Y	Y	Y	Y	Y	Y
30	1034139	TS	7	2	M	12-04-2022	2	3	6	5	10	21	2	Y	5	0.3	1	Y	Y	Y	Y	Y	Y
31	930891	AJ	9	2	M	04-04-2012	1	3	6	5	10	21	2	Y	7	2	3	Y	Y	Y	Y	Y	Y
32	1123830	K	10	2	F	03-04-2011	2	1	5	4	6	15	3	Y	8	2	1	Y	Y	Y	Y	Y	Y
33	1009172	HS	9	2	M	04-06-2012	2	1	5	4	6	15	3	Y	8	3	3	Y	Y	Y	Y	Y	Y
34	1075035	AS	11	3	M	6-22-2011	1	3	6	5	8	19	2	Y	5	6	1	Y	Y	Y	Y	Y	Y
35	1073267	S	10	2	M	5-15-2011	2	3	6	5	10	21	2	Y	6	4	2	Y	Y	Y	Y	Y	Y
36	932574	DS	8	2	M	3-19-2013	1	3	6	5	8	19	2	Y	5	1	3	N	N	Y	N	N	N
37	867814	BJ	5	1	M	27-02-2017	1	3	6	5	10	21	2	Y	5	0.2	1	Y	N	N	N	N	N
38	924163	TP	13	3	M	12-30-2008	1	3	6	5	10	21	2	Y	6	7	3	Y	Y	Y	Y	Y	Y
39	1116685	J	10	2	F	01-06-2012	1	1	6	5	10	21	2	Y	5	5	3	Y	Y	Y	Y	Y	Y
40	992452	DS	12	3	M	04-05-2010	1	1	6	5	6	17	2	Y	7	5	3	Y	Y	Y	Y	Y	Y
41	1027876	AS	9	2	M	03-04-2013	1	2	9	6	10	25	2	Y	5	3	1	Y	Y	Y	Y	Y	Y
42	1149579	YSG	7	2	M	2-13-2015	1	2	9	6	10	25	2	Y	5	2	3	Y	Y	Y	Y	Y	Y
43	1152070	RS	12	3	M	09-07-2010	1	2	9	5	10	24	2	Y	10	2	1	Y	Y	Y	Y	Y	Y
44	1073267	SS	8	2	M	23-02-2011	1	3	6	7	12	25	2	Y	7	1	1	Y	Y	Y	Y	Y	Y
45	1140002	GS	7	2	M	06-04-2013	1	3	9	6	10	25	2	Y	5	2	1	Y	Y	Y	Y	Y	Y
46	1141514	AS	11	3	M	3-19-2010	2	3	7	6	6	19	2	Y	5	6	3	Y	Y	Y	Y	Y	Y
47	1221576	T	10	2	F	6-13-2012	1	1	7	6	6	19	2	Y	5	5	1	Y	Y	Y	Y	Y	Y
48	1225022	M	13	3	M	08-05-2008	1	1	9	5	10	24	2	Y	6	8	2	Y	Y	Y	Y	Y	Y
49	1222541	S	7	2	M	06-04-2013	1	3	9	5	10	24	2	Y	6	1	3	N	N	Y	N	N	N
50	1266210	T	5	1	M	5-20-2015	1	3	6	7	12	25	2	Y	5	0	3	Y	Y	Y	Y	Y	Y
51	1271328	R	10	2	M	01-11-2012	1	3	6	5	10	21	2	Y	10	5	3	Y	Y	Y	Y	Y	Y
52	1123830	Y	7	2	M	5-18-2015	1	3	6	5	10	21	2	Y	5	2	1	Y	Y	Y	Y	Y	Y
53	1227216	R	10	2	F	08-08-2011	1	1	6	4	6	14	3	Y	9	1	1	Y	Y	Y	Y	Y	Y
54	1214769	GS	7	2	M	05-03-2014	1	3	6	5	6	17	2	Y	6	1	2	Y	Y	Y	Y	Y	Y
55	1278601	R	6	2	F	09-09-2015	1	1	6	4	6	14	3	Y	6	1	1	Y	Y	Y	Y	Y	Y
56	968727	K	10	2	M	9-21-2011	1	3	7	5	10	22	2	Y	8	1	3	Y	Y	Y	Y	Y	Y
57	632509	SR	5	1	M	09-06-2016	2	3	6	5	6	17	2	Y	5	0	1	Y	Y	Y	Y	Y	Y
58	1246568	DS	8	2	M	10-16-2013	1	3	6	5	10	21	2	Y	8	1	1	Y	Y	Y	Y	Y	Y
59	1034139	A	5	1	M	04-06-2015	1	3	6	5	10	21	2	Y	5	0	1	Y	Y	Y	Y	Y	Y
60	209577	SK	7	2	F	08-01-2015	1	3	7	5	10	22	2	Y	6	1	3	Y	Y	Y	Y	Y	Y
61	1236314	AS	9	2	M	02-09-2012	2	1	5	5	6	16	2	Y	7	2	2	Y	Y	Y	Y	Y	Y
62	1225022	DS	7	2	M	05-09-2015	1	3	6	5	6	17	2	Y	6	1	1	Y	Y	Y	Y	Y	Y

Sr. no	Mrd no.	Type of Controller _BUDESOnIDE MDI ALOnE	BUDESOnIDE MDI plus Oral Montelukast	BUDESOnIDE/ FLUTICASOnE PLUS LABA	BUDESOYIDE/ FLUTICASOYE PLUS LABA plus Oral MoYtelukast	OnLY ORAL MOnTELUKAST	chidhood asthma score	asthma control test	status of asthma	Status of Asthma Controlled / Uncontrolled	1. GoYe to Doctor for checkup, other thaY regular visit	2. Gone to EmergencY Department for nebulizations in last 12 months	3. Admitted to hospital for exacerbation in last 12 months	Missed school, number of days in last 12 months
1	934745	Y	Y	Y	Y	Y	15	-	U	u	Y	Y	Y	Y
2	1004593	Y	Y	Y	Y	Y	12	-	U	u	Y	Y	Y	Y
3	967918	Y	Y	Y	Y	Y	-	14	U	u	Y	Y	Y	Y
4	930891	Y	Y	Y	Y	Y	-	7	U	u	Y	Y	Y	Y
5	1001038	Y	Y	Y	Y	Y	16	-	U	u	Y	Y	Y	Y
6	1012023	Y	Y	Y	Y	Y	17	-	U	u	Y	Y	Y	Y
7	978832	Y	Y	Y	Y	Y	16	-	U	u	Y	Y	Y	Y
8	1007143	Y	Y	Y	Y	Y	15	-	U	u	Y	Y	Y	Y
9	988999	Y	Y	Y	Y	Y	18	-	U	u	Y	Y	Y	Y
10	1007803	Y	Y	Y	Y	Y	16	-	U	u	Y	Y	Y	Y
11	968727	Y	Y	Y	Y	Y	-	14	U	u	Y	Y	Y	Y
12	1054345	Y	Y	Y	Y	Y	14	-	U	u	Y	Y	Y	Y
13	1027876	Y	Y	Y	Y	Y	-	14	U	u	Y	Y	Y	Y
14	934745	Y	Y	Y	Y	Y	17	-	U	u	Y	Y	Y	Y
15	930891	Y	Y	Y	Y	Y	-	12	U	u	Y	Y	Y	Y
16	1026634	Y	Y	Y	Y	Y	14	-	U	u	Y	Y	Y	Y
17	1047635	Y	Y	Y	Y	Y	15	-	U	u	Y	Y	Y	Y
18	980697	N	N	N	Y	N	12	-	U	u	Y	Y	Y	Y
19	986965	Y	Y	Y	Y	Y	16	-	U	u	Y	Y	Y	Y
20	1099577	N	N	N	Y	N	17	-	U	u	Y	N	N	N
21	1001038	Y	Y	Y	Y	Y	16	-	U	u	Y	Y	Y	Y
22	1083562	Y	Y	Y	Y	Y	14	-	U	u	Y	Y	Y	Y
23	988999	Y	Y	Y	Y	Y	18	-	U	u	Y	Y	Y	Y
24	408381	N	N	N	Y	N	16	-	U	u	Y	Y	Y	Y
25	999774	Y	Y	Y	Y	Y	14	-	U	u	Y	Y	Y	Y
26	1027876	Y	Y	Y	Y	Y	17	-	U	u	Y	Y	Y	Y
27	1007803	Y	Y	Y	Y	Y	-	13	U	u	Y	Y	Y	Y
28	1054345	Y	Y	Y	Y	Y	17	-	U	u	Y	Y	Y	Y
29	1007803	Y	Y	Y	Y	Y	-	13	U	u	Y	Y	Y	Y
30	1034139	Y	Y	Y	Y	Y	15	-	U	u	Y	Y	Y	Y
31	930891	Y	Y	Y	Y	Y	18	-	U	u	Y	Y	Y	Y
32	1123830	Y	Y	Y	Y	Y	15	-	U	u	Y	Y	Y	Y
33	1009172	Y	Y	Y	Y	Y	16	-	U	u	Y	Y	Y	Y
34	1075035	Y	Y	Y	Y	Y	16	-	U	u	Y	Y	Y	Y
35	1073267	Y	Y	Y	Y	Y	16	-	U	u	Y	Y	Y	Y
36	932574	N	N	N	Y	N	16	-	U	u	Y	N	N	N
37	867814	N	Y	N	N	N	17	-	U	u	Y	Y	Y	N
38	924163	Y	Y	Y	Y	Y	17	-	U	u	Y	Y	Y	Y
39	1116685	Y	Y	Y	Y	Y	13	-	U	u	Y	Y	Y	Y
40	992452	Y	Y	Y	Y	Y	12	-	U	u	Y	Y	Y	Y
41	1027876	Y	Y	Y	Y	Y	18	-	U	u	Y	Y	Y	Y
42	1149579	Y	Y	Y	Y	Y	14	-	U	u	Y	Y	Y	Y
43	1152070	Y	Y	Y	Y	Y	15	-	U	u	Y	Y	Y	Y
44	1073267	Y	Y	Y	Y	Y	17	-	U	u	Y	Y	Y	Y
45	1140002	Y	Y	Y	Y	Y	17	-	U	u	Y	Y	Y	Y
46	1141514	Y	Y	Y	Y	Y	18	-	U	u	Y	Y	Y	Y
47	1221576	Y	Y	Y	Y	Y	15	-	U	u	Y	Y	Y	Y
48	1225022	Y	Y	Y	Y	Y	-	16	U	u	Y	Y	Y	Y
49	1222541	N	N	Y	N	N	17	-	U	u	N	N	N	Y
50	1266210	Y	Y	Y	Y	Y	16	-	U	u	Y	Y	Y	Y
51	1271328	Y	Y	Y	Y	Y	14	-	U	u	Y	Y	Y	Y
52	1123830	Y	Y	Y	Y	Y	14	-	U	u	Y	Y	Y	Y
53	1227216	Y	Y	Y	Y	Y	18	-	U	u	Y	Y	Y	Y
54	1214769	Y	Y	Y	Y	Y	16	-	U	u	Y	Y	Y	Y
55	1278601	Y	Y	Y	Y	Y	17	-	U	u	Y	Y	Y	Y
56	968727	Y	Y	Y	Y	Y	13	-	U	u	Y	Y	Y	Y
57	632509	Y	Y	Y	Y	Y	18	-	U	u	Y	Y	Y	Y
58	1246568	Y	Y	Y	Y	Y	17	-	U	u	Y	Y	Y	Y
59	1034139	Y	Y	Y	Y	Y	16	-	U	u	Y	Y	Y	Y
60	209577	Y	Y	Y	Y	Y	15	-	U	u	Y	Y	Y	Y
61	1236314	Y	Y	Y	Y	Y	16	-	U	u	Y	Y	Y	Y
62	1225022	Y	Y	Y	Y	Y	14	-	U	u	Y	Y	Y	Y

Sr. no	Mrd no.	Exacerbations	associted fever	Predisposing factor	summer season (march to june)	monsoon (july -Oct)	Winter (nov -Feb)	Emotions(laughing/crying)	Pollen	Food	Exercise	Repeated viral infections(4 weeks)	List of possible pollutants to be discussed	Fumes	Dust	Exhaled tabacoo exposure	traffic densitY Year home /school	industriesYear home and school	Home/neighbourhood construction activitY	cooking: use of wood/coal/kerosene
1	934745	Y	1	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
2	1004593	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
3	967918	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
4	930891	Y	1	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
5	1001038	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
6	1012023	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
7	978832	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
8	1007143	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
9	988999	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
10	1007803	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
11	968727	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
12	1054345	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
13	1027876	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
14	934745	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
15	930891	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
16	1026634	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
17	1047635	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
18	980697	Y	1	-	Y	N	Y	N	N	Y	N	N	-	N	Y	N	N	Y	N	N
19	986965	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
20	1099577	N	3	-	N	N	Y	Y	N	Y	N	N	-	N	Y	N	N	N	N	N
21	1001038	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
22	1083562	Y	1	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
23	988999	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
24	408381	Y	3	-	Y	N	Y	N	N	N	N	N	-	N	Y	N	N	N	N	Y
25	999774	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
26	1027876	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
27	1007803	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
28	1054345	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
29	1007803	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
30	1034139	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
31	930891	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
32	1123830	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
33	1009172	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
34	1075035	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
35	1073267	Y	1	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
36	932574	N	3	-	Y	N	Y	N	N	Y	Y	N	-	Y	Y	N	N	N	N	N
37	867814	Y	3	-	Y	N	Y	N	N	N	N	N	-	N	Y	N	N	N	N	N
38	924163	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
39	1116685	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
40	992452	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
41	1027876	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
42	1149579	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
43	1152070	Y	1	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
44	1073267	Y	2	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
45	1140002	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
46	1141514	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
47	1221576	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
48	1225022	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
49	1222541	Y	3	-	Y	N	Y	N	N	Y	N	N	-	N	Y	N	N	N	N	N
50	1266210	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
51	1271328	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
52	1123830	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
53	1227216	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
54	1214769	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
55	1278601	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
56	968727	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
57	632509	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
58	1246568	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
59	1034139	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
60	209577	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
61	1236314	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
62	1225022	Y	3	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y

Sr. no	Mrd no.	type of room heating :biomass/coal	pets: dogs /cat	house dust mite	mould/wet walls in home	chemicals used at home for claening	use of agarbatti /candles	mosquito coils	stubble burning/fumes exposure	Device used Metered dose iYhaler (MDI) with spacer	Device used Is Spacer alwaYs used while administration of MDI	Rotahaler no. of regular Chest clinic visits in last 3 months	Rotahaler Home nebulization used as SOS basis of Bronchodilators	Rotahaler Oral steroids use in last 4 weeks	Gestation at Birth	Exclusive Breast feeding (4-6 moYths)
1	934745	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	YY
2	1004593	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
3	967918	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
4	930891	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	P	Y
5	1001038	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
6	1012023	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
7	978832	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
8	1007143	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
9	988999	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
10	1007803	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
11	968727	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
12	1054345	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
13	1027876	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
14	934745	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
15	930891	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
16	1026634	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
17	1047635	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
18	980697	N	Y	N	N	N	Y	Y	N	Y	Y	N	N	N	T	N
19	986965	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
20	1099577	N	N	N	N	N	Y	Y	N	Y	N	N	N	N	T	Y
21	1001038	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
22	1083562	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
23	988999	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
24	408381	N	Y	N	N	N	N	Y	N	Y	Y	N	Y	Y	T	Y
25	999774	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
26	1027876	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
27	1007803	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
28	1054345	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
29	1007803	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
30	1034139	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
31	930891	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
32	1123830	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
33	1009172	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	P	Y
34	1075035	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	P	Y
35	1073267	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
36	932574	N	N	N	N	N	Y	N	N	Y	Y	N	N	N	T	Y
37	867814	N	N	N	N	N	N	Y	N	N	N	N	N	N	T	Y
38	924163	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	P	Y
39	1116685	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
40	992452	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
41	1027876	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
42	1149579	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
43	1152070	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
44	1073267	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
45	1140002	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
46	1141514	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
47	1221576	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
48	1225022	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
49	1222541	N	Y	N	N	N	N	N	N	Y	Y	N	N	N	T	N
50	1266210	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
51	1271328	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
52	1123830	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
53	1227216	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
54	1214769	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
55	1278601	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
56	968727	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
57	632509	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
58	1246568	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
59	1034139	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
60	209577	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
61	1236314	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
62	1225022	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y

Sr. no	Mrd no.	H/o allergn	Asthma	Urticaria	Eczema	Conjunctivitis	Other specifY	Relation patient	Smoking in FamilY	Eosinophil (> 4%)	Vit D levels	PEFR	NORMAL	Height	expected for age	Weight	expected for age	BMI	GERD	nasal polNp	AdeYoids	Allergic RhiYitis	Measure of MDI INhaled corticosteroid AdhereNce was the percentage of inhalations performed correctIn between visits 1 and 2
1	934745	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	290	344	165	137	40	32	15	N	N	Y	Y	1
2	1004593	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	210	248	141	132	23.6	28	11.8	N	N	Y	N	1
3	967918	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	300	275	149	154	53.5	45	23.6	N	N	Y	N	1
4	930891	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	140	256	137	133	25.2	28	13.42	N	N	Y	N	1
5	1001038	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	168	232	133	137	32	30	18	N	N	Y	N	1
6	1012023	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	230	274	145	137	35	32	16	N	N	Y	N	1
7	978832	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	220	246	137	126	26.8	25	14.2	N	N	Y	N	1
8	1007143	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	150	169	115	117	19.5	20	14.7	N	N	Y	N	1
9	988999	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	180	176	119	113	27.7	18	17.5	N	N	Y	N	1
10	1007803	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	210	229	135	126	28	25	15.3	N	N	Y	N	1
11	968727	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	200	333	162	147	39.5	38	15	N	N	Y	N	3
12	1054345	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	180	192	124	130	32.5	26	21.15	N	N	Y	N	3
13	1027876	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	240	235	134	155	25.2	43	14	N	N	Y	N	3
14	934745	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	210	239	145	137	48.1	32	17	N	N	Y	N	1
15	930891	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	250	278	157	153	33	44	13.38	N	N	Y	N	1
16	1026634	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	190	199	126	120	22.7	22	14.2	N	N	Y	N	1
17	1047635	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	300	333	162	148	39.5	38	15.05	N	N	Y	N	1
18	980697	Y	Y	N	N	N	N	Y	N	N	-	120	134	105	115	16.6	20	15.05	N	N	N	Y	1
19	986965	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	190	249	138	132	33	28	17.3	N	N	Y	N	3
20	1099577	Y	N	N	N	Y	N	N	N	N	-	160	176	119	120	26	21	14.5	N	N	N	Y	1
21	1001038	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	130	137	106	109	12	12	10.6	N	N	Y	N	2
22	1083562	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	270	288	149	138	48.4	31	21.8	N	N	Y	N	1
23	988999	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	151	295	110	109	15.6	18	15.1	N	N	Y	N	1
24	408381	Y	N	Y	N	N	N	N	N	N	-	240	281	147	144	53	35	24.5	N	N	N	Y	1
25	999774	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	130	149	111	110	19	18	15.4	N	N	Y	N	1
26	1027876	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	210	239	135	143	33	35	18.1	N	N	Y	N	1
27	1007803	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	280	275	152	155	43	46	18.6	N	N	Y	N	1
28	1054345	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	240	277	146	143	32	35	15.1	N	N	Y	N	2
29	1007803	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	250	314	161	153	78.2	52	28.6	N	N	Y	N	2
30	1034139	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	190	232	133	120	34	22	19.2	N	N	Y	N	1
31	930891	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	180	232	133	136	27	30	15.2	N	N	Y	N	2
32	1123830	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	200	229	135	137	30	31	16.4	N	N	Y	N	2
33	1009172	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	213	267	143	133	28.3	29	13.8	N	N	Y	N	1
34	1075035	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	270	280	144.5	147	38.9	38	18.7	N	N	Y	N	3
35	1073267	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	210	246	137	138	31	32	16.5	N	N	Y	N	1
36	932574	Y	N	N	N	N	N	N	N	N	-	190	216	129	127	25	25	15	N	N	N	Y	1
37	867814	Y	Y	N	N	N	N	N	N	N	-	170	130	108	109	17	18	14.5	N	N	N	Y	3
38	924163	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	190	351	167	155	48	43	17.2	N	N	Y	N	2
39	1116685	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	70	220	124	137	24.5	30	15.9	N	N	Y	N	3
40	992452	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	330	280	155	145	41.7	37	17.3	N	N	Y	N	1
41	1027876	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	190	225	131	133	23.5	27	13.9	N	N	Y	N	3
42	1149579	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	160	218	115	120	18	22	13.7	N	N	Y	N	3
43	1152070	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	240	319	158	151	32.6	41	13.05	N	N	Y	N	3
44	1073267	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	100	200	128	127	26.3	25	16	N	N	Y	N	1
45	1140002	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	110	169	115	120	19.4	22	14	N	N	Y	N	3
46	1141514	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	160	242	136	142	25	35	13.6	N	N	Y	N	3
47	1221576	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	160	229	135	137	22.9	31	12.5	N	N	Y	N	3
48	1225022	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	225	287	155	148	49	43	20	N	N	Y	N	1
49	1222541	Y	N	N	N	N	N	N	N	N	-	200	183	119	122	17.8	23	12.5	N	N	N	Y	1
50	1266210	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	100	110	99	106	13	18	13.2	N	N	Y	N	1
51	1271328	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	210	240	147	140	53	33	24	N	N	Y	N	3
52	1123830	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	150	160	118	123	20	23	14.3	N	N	Y	N	3
53	1227216	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	140	150	118	140	22.5	32	16	N	N	Y	N	1
54	1214769	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	190	207	127	125	26	22	16	N	N	Y	N	1
55	1278601	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	110	153	112	113	16.3	18	13	N	N	Y	N	3
56	968727	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	240	267	142	142	34	34	16.9	N	N	Y	N	1
57	632509	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	130	144	108	108	16.7	16	14.3	N	N	Y	N	3
58	1246568	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	210	235	135	130	18	25	10	N	N	Y	N	1
59	1034139	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	120	140	107	109	15	16	13	N	N	Y	N	1
60	209577	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	110	130	104	123	21.8	22	20	N	N	Y	N	1
61	1236314	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	240	270	131	136	26	29	15	N	N	Y	N	3
62	1225022	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	140	158	112	122	20	23	15.9	N	N	Y	N	1

Sr. no	Mrd no.	Inhaler device Technique check list	MDI with spacer	remove the cap	remove the cap of puffer . Shake the puff 5or 6 times	insert the puffer in the hole at the back of the spacer	blow all Your breath out the until lungs are emptY	insert the spacer mouthpieceinto the mouth	press the down once on the puffer's canister	slowlY breathe infrom the spacer full breath	hold Your breath for at least 4 seconds	critical mistakes . Pressure metered dose inhalers	do not remove the cover	do Yot hold the inhaler in a vertical position	firing the device before beginning iYspiration
1	934745	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
2	1004593	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
3	967918	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
4	930891	2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5	1001038	2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
6	1012023	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
7	978832	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
8	1007143	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
9	988999	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
10	1007803	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
11	968727	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
12	1054345	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
13	1027876	2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
14	934745	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
15	930891	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
16	1026634	2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
17	1047635	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
18	980697	2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N
19	986965	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
20	1099577	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N
21	1001038	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
22	1083562	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
23	988999	2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
24	408381	2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N
25	999774	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
26	1027876	2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
27	1007803	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
28	1054345	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
29	1007803	2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
30	1034139	2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
31	930891	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
32	1123830	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
33	1009172	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
34	1075035	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
35	1073267	2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
36	932574	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N
37	867814	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N
38	924163	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
39	1116685	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
40	992452	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
41	1027876	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
42	1149579	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
43	1152070	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
44	1073267	2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
45	1140002	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
46	1141514	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
47	1221576	2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
48	1225022	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
49	1222541	1	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	N
50	1266210	2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
51	1271328	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
52	1123830	2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
53	1227216	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
54	1214769	2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
55	1278601	2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
56	968727	2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
57	632509	2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
58	1246568	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
59	1034139	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
60	209577	2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
61	1236314	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
62	1225022	2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Sr. no	Mrd no.	inhalation stopped	inhlataion too fast	incorrect insertion of Mdi into the inhaler camera	several device firing in the same inhalation	no breath hold after inhalation	cough during inhalation	impact of Poor Asthma control	Limitations insports , plan and dailY activites	Absent from work	parent absent from work	impact on sleep	m m	Psychosocial impact
1	934745	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
2	1004593	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
3	967918	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
4	930891	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5	1001038	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
6	1012023	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
7	978832	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
8	1007143	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
9	988999	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
10	1007803	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
11	968727	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
12	1054345	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
13	1027876	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
14	934745	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
15	930891	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
16	1026634	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
17	1047635	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
18	980697	N	N	N	N	N	N	N	Y	Y	N	Y	Y	N
19	986965	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
20	1099577	N	N	N	N	N	N	N	Y	Y	Y	N	N	N
21	1001038	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
22	1083562	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
23	988999	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
24	408381	N	N	N	N	N	N	N	Y	Y	N	Y	Y	N
25	999774	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
26	1027876	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
27	1007803	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
28	1054345	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
29	1007803	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
30	1034139	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
31	930891	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
32	1123830	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
33	1009172	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
34	1075035	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
35	1073267	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
36	932574	N	N	N	N	N	N	N	Y	Y	Y	N	N	Y
37	867814	N	N	N	N	N	N	N	Y	Y	N	Y	Y	N
38	924163	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
39	1116685	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
40	992452	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
41	1027876	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
42	1149579	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
43	1152070	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
44	1073267	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
45	1140002	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
46	1141514	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
47	1221576	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
48	1225022	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
49	1222541	N	N	N	N	N	N	N	Y	Y	Y	N	Y	N
50	1266210	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
51	1271328	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
52	1123830	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
53	1227216	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
54	1214769	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
55	1278601	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
56	968727	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
57	632509	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
58	1246568	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
59	1034139	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
60	209577	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
61	1236314	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
62	1225022	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

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The Principal,
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Subject: Approval of Plan of Thesis.

This is to inform you that the Faculty of Medical Sciences in its meeting held on 29.10.2021 has approved the plan of thesis of **Harpreet Singh**, a student of your college for **MD Paediatrics** along with the names of Supervisor/Co-Supervisor as under:-

Topic Plan of Thesis
Study of factors affecting poor control of bronchial asthma in children.

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The student has to submit the four copies of thesis (along with PDF format) , to the Controller of Examinations, BFUHS, Faridkot, at least six months before the commencement of theory examination, if he/she is otherwise eligible to take the examination. He /She must directed to attach a photocopy of this letter with the forwarding letter while submitting thesis to the University along with the letter of approval of University for change of supervisor/Co-Supervisor, change of topic,(if any).

Dr. S P Singh MS(Oph)
Controller of Examinations

Note :

81. *If any discrepancy found regarding topic of thesis or Supervisor/Co-Supervisor, inform undersigned within one month after issue of this letter.*
82. *The student may submit the thesis as per the schedule already conveyed i.e for May/June examination 30th Nov of the preceding the year of examination and for Nov/Dec examinations 31st May of the year of examination.*

STUDY OF FACTORS AFFECTING POOR CONTROL OF BRONCHIAL ASTHMA IN CHILDREN

THESIS PROPOSAL

FOR APPROVAL OF SUBJECT OF THESIS TO BE SUBMITTED IN

PARTIAL FULFILMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

MD

In

PAEDIATRICS

OF THE

BABA FARID UNIVERSITY OF HEALTH SCIENCES

FARIDKOT

MARCH, 2021

DR. HARPREET SINGH

DEPARTMENT OF PAEDIATRICS
DAYANAND MEDICAL COLLEGE AND HOSPITAL
LUDHIANA

ABSTRACT OF PLAN OF THESIS

TITLE	Study of factors affecting poor control of bronchial asthma in children
DEGREE	MD Paediatrics
NAME OF THE CANDIDATE	Dr. Harpreet Singh
SUPERVISOR	Dr Gurdeep Singh Dhooria, Associate Professor, Department of Paediatrics, DMC&H, Ludhiana
CO – SUPERVISOR	Dr. Puneet Aulakh Pooni, Professor & Head, Department of Paediatrics, DMC&H, Ludhiana
INSTITUTION	Dayanand Medical College & Hospital, Ludhiana
UNIVERSITY	Baba Farid University of Health Sciences, Faridkot

Introduction: Bronchial Asthma is a chronic inflammatory airway disease that leads to reversible narrowing and constriction of airway and tendency of the airway to over-react to stimuli.

Aim of Study: To study the factors affecting poor control of bronchial asthma in children who are on controller therapy.

Materials & methods: It will be a observational study of 15 months done in Pediatric chest Clinic of a tertiary care hospital DMCH Ludhiana. Demographic data, symptoms of the children before and during the treatment will be entered in the performa and data will be analysed for the factors affecting poor control of asthma.

Clinical Significance: To see the factors associated with poor control of asthma and how to prevent them.

Keywords: Cough, wheeze, controller therapy, poor control, Nocturnal wake up, school absenties

(Signature) Candidate	(Signature) Co-supervisor	(Signature) Supervisor	(Signature) Principal

CERTIFICATE OF FACILITIES AVAILABLE

This is to certify that the facilities for work on the subject of thesis titled **"STUDY OF FACTORS AFFECTING POOR CONTROL OF BRONCHIAL ASTHMA IN CHILDREN"** exist in the Department of Paediatrics, DMC&H, Ludhiana and will be provided to the candidate. We will see that the data being included in the thesis is genuine and is collected by the candidate herself under our supervision and guidance.

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Date : _____

APPROVAL PROFORMA
BY RESEARCH & ETHICAL COMMITTEE
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Name of candidate	Dr. Harpreet Singh
Department	Pediatrics
Topic of Thesis	Study of factors affecting poor control of bronchial asthma in children
Likely date of appearing in PG examination	May 2023
Date of enrollment	26th July, 2020
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Dr. Harpreet Kaur (Professor & Head, Pathology)	Mr. R K Sharma (Legal Expert)
Dr. Jaspal Singh (Professor & Head, Surgery)	Dr. Ramit Mahajan (Associate Professor, Gastroenterology)
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Approved: Yes / No

Dr. Sandeep Puri
Chairperson
Research Committee

Approved: Yes / ~~No~~

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PROFORMA FOR REGISTRATION OF SUBJECT FOR DISSERTATION

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3	COURSE OF STUDY AND SUBJECT	MD Paediatrics
4	DATE OF ADMISSION OF COURSE	26/7/2020
5	TITLE OF THE TOPIC	Study of the factors affecting poor control of Bronchial asthma in children

6. BRIEF RESUME OF THE INTENDED WORK

6.1 NEED FOR THE STUDY

Asthma is a chronic inflammatory airway disease that leads to reversible narrowing and constriction of the airway and tendency of the airway to over react to stimuli.[1] It oftens manifests with recurrent episodic cough breathlessness, wheezing and poor exercise tolerance.[1,2]

Asthma is not a curable disease thus asthma control is the main goal of disease management. Asthma Control has two domains

1 Symptoms Control

2 Risk factors for future outcomes

Assessment of symptoms control is done by using

For 4-11 years - Childhood Asthma Control Test

Control of Bronchial Asthma will be assessed by “Childhood Asthma Control Test” which consists of total 27 score

Score of 20 or greater ; well controlled

Score of 13 to 19 ; not well controlled

score of 12 or less ; very poorly controlled

English and Hindi version depending upon parents and children

For 12-18 years - Asthma Control Test

The Asthma Control Test is used to determine how well a patient’s asthma is controlled. The questionnaire consists of five questions regarding the occurrence of respiratory symptoms, and assessment of symptom control during the previous 4 weeks. All 5 question is rated on a scale from 0– 5 and values are summed for the ACT score.

A score of 5-19 indicates poorly or not controlled asthma

English and Hindi version depending upon parents and children

Uncontrolled asthma causes poor quality of life, reduces work productivity, impairs daily physical and social activities, school absenteeism, hospitalization and emergency room visits, as well as poor parental/caregiver and child’s quality of life and increased family

and spending on health, and can lead to death also,[3] where as controlled asthma has the potential to reduce no of hospitalizations as well as direct and indirect cost on patients and the society.[4] Several studies show that the prevalence of poor asthma control ranges from 57% to greater than 80%. This discrepancy is most likely related to the different methodologies applied, including the study group selected, because both selected patient populations 'and samples from the general population[5,6] have been used. In the International Cross-Sectional and Longitudinal assessment of Asthma Control (LIAISON) study, major determinants for poor asthma control were reported to be seasonal worsening and persistent pollutant exposure to allergens/irritants (self-reported and reported by their physician), followed by treatment-related issues Not many studies have been conducted in India on measuring asthma control using objective parameters. The aim of the present study was to assess asthma control using Asthma control. We also identified the probable risk factors that contributed to poor asthma control.

As there is growing concern among the parents regarding poor control of asthma despite on controller therapy and finding the triggering factors (compliance of treatment, pets, house, dust mites, wet walls, traffic area, use of woods, kerosene oil etc,) responsible for poor control Our study aimed to assess the associations between possible risk factors and poor asthma control evaluated by the Childhood asthma Control Test

To study factors associated with poor control of asthma who are on controller Therapy by using childhood asthma control test. Our study aimed to assess the associations between possible risk factors and poor asthma control evaluated by the Childhood asthma control test).[7,8]

We want to do this study to enlighten the parents about various triggers to watch for better control of asthma**.**

6.2 REVIEW OF LITERATURE

Asthma is a chronic disorder of the bronchial tree, characterized by completely or partially reversible airway obstruction, which may improve spontaneously or may subside only after specific therapy. Airway hyperresponsiveness is defined as the narrowing of the airways as response to a variety of stimuli, such as allergens and nonspecific triggers and infections. Asthma is a chronic disorder of both children and adults, with 300 million individuals afflicted worldwide (Global Initiative for Asthma (GINA) guidelines).[5]

Although the prevalence of asthma has increased over the last decades, especially so in children[6], there is still no sound explanation for this increase. Asthma symptoms include recurrent wheezing, coughing, chest tightness, and dyspnea, with nightly and early morning symptoms being more prevalent, whereby quality of life is often reduced.[7]

A major goal of asthma management is to achieve well-controlled asthma which had been associated with improved quality of life of children and their caregivers, fewer hospitalization and emergency room visit and increased productivity among children and their parents/caregivers

ASTHMA CONTROL; It is the extend to which the manifestations of asthma can be observed in the patient or have been reduced or removed by the treatment.[8,9] It is determined by the interaction between the patient genetic back ground, underlying disease processes, the treatment they are taking, environment, psychosocial factors.

Asthma control assessment in two domains: symptoms control and, future risk of outcome. Poor symptom control is burdensome to patients and increases the risk for exacerbations, but the patients with apparently mild asthma, can still have exacerbations

Assessment of a patient with asthma

- Assess symptom control (chest tightness, breathlessness over last 4 weeks)

- Identify the risk factors for exacerbation
- Measure the lung function at start of treatment, 3-6 months of treatment after starting controller therapy

Assessment treatment issues

- Document the current patient's treatment step
- Whether using inhalers, oral drugs or both

Investigating a case of poor symptom control and or exacerbations on controller therapy

Watch patient using their inhalers, discuss adherence and barriers to use(have empathic discussion to identify poor adherence as many patient don't use their inhalers as prescribe.

Confirm the diagnosis of bronchial Asthma

If possible remove potential risk factors, Assess and manage comorbidities (domestic allergen ,occupational allergen etc and co morbidities like rhinitis , obesity,GERD,

Consider step-up treatment

Bankole peter kuti et al did a study of 106 children with male:female ratio of 1.5:1, and majority (83.0%) had mild intermittent asthma. Suboptimal asthma control was observed in 19 (17.9%) of the children. Household smoke exposure, low socioeconomic class, unknown triggers, concomitant allergic rhinoconjunctivitis, and poor parental asthma knowledge, were significantly associated with suboptimal control ($P < 0.05$). Low socioeconomic class (odds ratio [OR] =6.231; 95% confidence interval [CI] =1.022–8.496; $P = 0.005$) and poor parental asthma knowledge (OR = 7.607; 95% CI = 1.011–10.481; $P = 0.007$) independently predict suboptimal control.

In a study conducted by Sanford and colleagues in 2010, the most common predictors of uncontrolled asthma in adults were low education, insurance status, current smoking status, body mass index (BMI) greater than 30 kg/m,^{2} and a history of gastroesophageal symptoms.[10] Another cross-sectional study in Brazil found three factors that were associated with uncontrolled asthma: Severity of asthma, access to medications, and use of inhaled corticosteroids.[11]

House-dust mite and cockroach exposure have shown that the prevalence of sensitization and subsequent development of asthma. Exposure to cockroach allergen, for example, a major allergen in inner-city dwellings, is an important cause of allergen sensitization, a risk factor for the development of asthma. In addition, allergen exposure can promote the persistence of airway inflammation and likelihood of an exacerbation.

Household cigarette smoke exposure was the single most significant factor in predicting poor control. This is comparable with other studies that found that children exposed to tobacco smoke were more likely to have moderate to severe asthma than those with mild intermittent asthma,[12] as well as increased asthma exacerbations, symptoms and negative effects on lung function.[13,14]

Smoking is also a factor in poor program attendance or poor educational impact.[15,16] A study, 67 (44%) children lived in households with regular or occasional smoke exposure, and asthma control in these households was significantly worse than in nonsmoking households (51% of poor control versus 21% of acceptable control, P=0.005). In fact, each hour per week of smoke exposure increased the likelihood of poor control by 33%. Therefore, reducing exposure should be a high priority for clinicians and health providers. In addition, despite the use of inhaled corticosteroids in 19 of the children with smoke exposure, none achieved acceptable control. Avoidance of smoke exposure should be a relatively simple management strategy (eg, parents smoke only outside). However, researchers acknowledge that smoking is riddled with emotional and behavioural complexities that clinicians often ignore.[15,17,18]

Low socioeconomic class is an important predictor of poor control of asthma control in the study which is reported by Bloomberg *et al*.[19] and Chen *et al*.[20] in America. Stanford *et al*.[10] also reported caregivers' unemployment closely related to low social class as a significant predictor of poor asthma control in a cohort of asthmatics. Low socioeconomic class puts the caregivers at risk of not being able to meet the financial obligations in terms of procuring the appropriate rescue and controller medications for optimal asthma control.[1,6] Secondly, children with asthma from low socioeconomic class are more likely to be exposed to other risks factors for asthma exacerbation and respiratory tract infections like indoor and outdoor air pollution.[22]

Allergic rhinoconjunctivitis predisposes children to infections of the respiratory tract which are important triggers of acute exacerbation in asthmatics.[23] Allergic rhinoconjunctivitis is a common occurrence in children with asthma as they form part of the “atopic march.”[24,25]

Poor inhaler technique is a common problem among patients with asthma, and asthma control worsens as the number of mistakes in technique increases [26] Asthma guidelines stress the importance of patient training in inhaler use.[5,27] Moreover, trainers should be competent, and inhaler technique should be rechecked at every routine asthma consultation with patients demonstrating their inhalation technique.

6.3 AIMS AND OBJECTIVES OF THE STUDY

1. To study the factors affecting poor control of asthma in children who are on controller therapy.

7. MATERIALS AND METHODS

It will be a observational study in 15 months (1st March 2021 to 31st May 2021). Data, symptoms of the children before and during the treatment will be entered in the performa and data will be analysed the factors affecting poor control of asthma. It will be done in Paediatric chest Clinic of a tertiary care hospital DMCH Ludhiana

7.1 Source of Data

Children between 4-18 years age with bronchial asthma attending chest clinic and must have received atleast two months of controlled therapy

7.2 METHOD OF COLLECTION OF DATA

INCLUSION CRITERIA:

1 Children between age of 4-18 years with bronchial asthma attending chest clinic will be taken.

2 Children must have received two months of controlled therapy

EXCLUSION CRITERIA

1. Children less than 4 years of age with multi trigger wheeze will be excluded
2. Children with chronic diseases like cystic fibrosis will be excluded
3. Parents who are not giving consent for the study.

STUDY POPULATION;

1. Children aged 4-18 years with physician –diagnosed asthma or history of recurrent episodes of cough, wheezing, chest tightness and shortness of breath
2. Sociodemographic information obtained from parents or the caregivers included age, sex, house environment, Address of child.
3. Age at diagnosis of asthma, duration and Severity of bronchial Asthma i.e intermittent, mild persistent, moderate persistent and severe persistent will be asked
4. Duration of controller therapy and drugs used will be asked
5. History about previous asthma-related hospitalization and possible triggering factors of acute asthma exacerbation was also obtained

6. Family and personal history of other allergic conditions such as allergic rhino conjuctivitis and dermatitis will be obtained.
7. Seasonal association with asthma symptoms will also be considered
8. Study of gestational age at delivery of the children and whether they were exclusively breastfed or not.
9. Number of individuals sharing the same room as the child and overcrowding for this study was defined as having three or more persons sharing the same room as the child
10. Information about the presence of pets, tobacco, smokers/users in the household and source of fuel for household cooking was also obtained
11. Parental socioeconomic class will be categorisied by modified kuppuswammy Scale.
12. Patient must have attended at least two months of asthma clinic
13. The level of asthma control for the study participants was assessed according to NAEPP guidelines.(100) Children with at least one nocturnal asthma symptoms, 2 or more daytime symptoms within a month, use of rescue medication for at least twice per week and any form of limitation of normal activities as a result of asthma symptoms were classified as having partly and poorly control. Children without the highlighted symptoms were classified as having well-controlled asthma.

Questionnaire

- The Childhood Asthma Control Test is a widely used self-administered assessment tool to determine how well a patient's asthma is controlled. The questionnaire consists of seven questions regarding the occurrence of respiratory symptoms, and a self-assessment of symptom control during the previous 4 weeks. First four question is rated on a scale from 0–3 and next three questions rated 0-4 and values are summed for the C-ACT score. A low C-ACT score [12 or less] indicates poorly controlled asthma, a score of 13 to 19 indicates not controlled asthma and a score of 20 or more indicates well-controlled asthma.

- The Asthma Control Test is a widely used self-administered assessment tool to determine how well a patient's asthma is controlled. The questionnaire consists of five questions regarding the occurrence of respiratory symptoms, and a self-assessment of symptom control during the previous 4 weeks. All 5 question is rated on a scale from 0– 5 and values are summed for the ACT score. A score of 5-19 indicates poorly or not controlled asthma. A score of 20 or more indicates well-controlled asthma.

Outcome

To know the factors causing poor control of asthma in children.

Statistical Analysis (Name of the method in plan)

Data will be entered in terms of range: mean ±standard deviation (± SD) median, Frequencies (number of cases) and relative frequencies (percentages) as appropriate. All Statistical calculations will be done using (Statistical Package for the social science) SPSS 21 Version (SPSS Inc., Chicago, IL, USA) statistical program for Microsoft Windows

7.3 DOES THE STUDY REQUIRE ANY INVESTIGATIONS OR INTERVENTIONS TO BE CONDUCTED ON PATIENTS OR OTHER HUMANS OR ANIMALS? IF SO, PLEASE DESCRIBE BRIEFLY.

No.

7.4 HAS ETHICAL CLEARANCE BEEN OBTAINED FROM YOUR INSTITUTION IN CASE OF 7.3?

Attached herewith

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PROFORMA **Sr No.** _____

Name _____ Age _____

Gender ☐ Male ☐ Female Date of Birth_____

Locality ☐ Urban ☐ Rural

House environment ☐ Crowded area ☐ Slum ☐ Elite area

Education of Father

Education of mother

Socioeconomic status

Overcrowding (4 people or more in one room):

Address_____

Age at Diagnosis of Bronchial Asthma:

Duration of Bronchial Asthma: Age of child – Age at Diagnosis=

Severity of Bronchial Asthma

☐ Intermittent ☐ Mild persistent

☐ Moderate persistent ☐ Severe persistent

On Treatment

Duration of Controller therapy: **months**

Type of Controller

BUDESONIDE MDI ALONE

Low Dose
Medium Dose
High Dose

BUDESONIDE MDI plus Oral Montelukast

Low Dose
Medium Dose
High Dose

BUDESONIDE/ FLUTICASONE PLUS LABA

Low Dose
Medium Dose
High Dose

BUDESONIDE/ FLUTICASONE PLUS LABA plus Oral Montelukast

Low Dose
Medium Dose
High Dose

ONLY ORAL MONTELUKAST

Signature of Candidate

Signature of Supervisor

Childhood Asthma Control Test for children 4 to 11 years.

This test will provide a score that may help the doctor determine if your child's asthma treatment plan is working or if it might be time for a change

How to take the Childhood Asthma Control Test

Step 1 Let your child respond to the first four questions (1 to 4). If your child needs help reading or understanding the question, you may help, but let your child select the response. Complete the remaining three questions (5 to 7) on your own and without letting your child's response influence your answers. There are no right or wrong answers.

Step 2 Write the number of each answer in the score box provided.

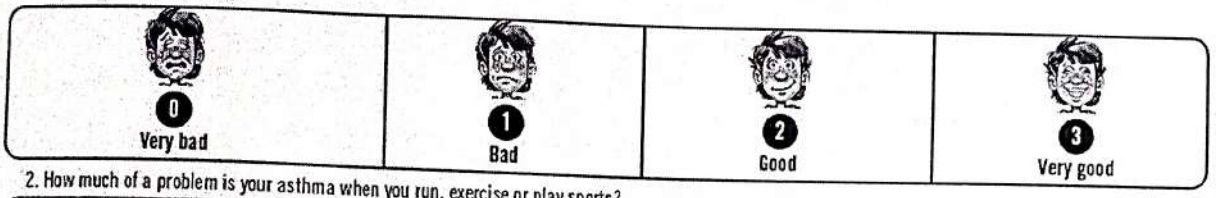
Step 3 Add up each score box for the total.

Step 4 Take the test to the doctor to talk about your child's total score.

19 or less If your child's score is 19 or less, it may be a sign that your child's asthma is not controlled as well as it could be. Bring this test to the doctor to talk about the results.

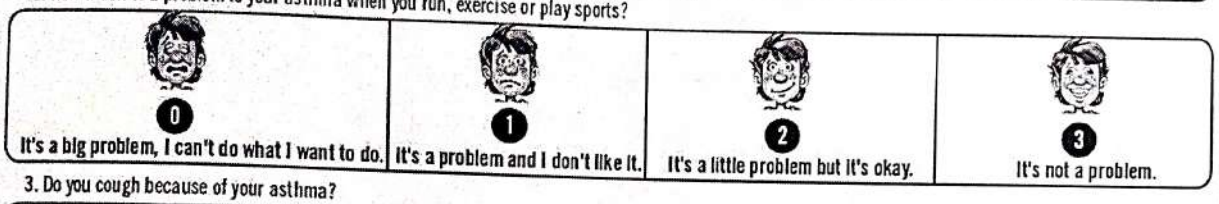
Have your child complete these questions.

1. How is your asthma today?



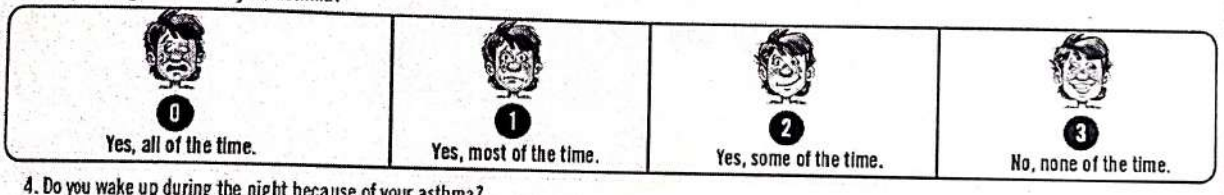
SCORE ☐

2. How much of a problem is your asthma when you run, exercise or play sports?


0
It's a big problem, I can't do what I want to do.
1
It's a problem and I don't like it.
2
It's a little problem but it's okay.
3
It's not a problem.

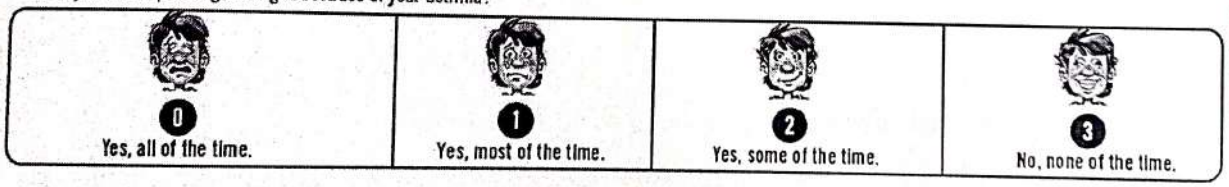
☐

3. Do you cough because of your asthma?



☐

4. Do you wake up during the night because of your asthma?



☐

Please complete the following questions on your own.

5. During the last 4 weeks, how many days did your child have any daytime asthma symptoms?

5	4	3	2	1	0
Not at all	1-3 days	4-10 days	11-18 days	19-24 days	Everyday

☐

6. During the last 4 weeks, how many days did your child wheeze during the day because of asthma?

5	4	3	2	1	0
Not at all	1-3 days	4-10 days	11-18 days	19-24 days	Everyday

☐

7. During the last 4 weeks, how many days did your child wake up during the night because of asthma?

5	4	3	2	1	0
Not at all	1-3 days	4-10 days	11-18 days	19-24 days	Everyday

☐

TOTAL ☐

Signature of Candidate

Signature of Supervisor

FOR PATIENTS:

Take the Asthma Control Test™ (ACT) for people 12 yrs and older.

Step 1 Write the number of each answer in the score box provided.

Step 2 Add the score boxes for your total.

Step 3 Take the test to the doctor to talk about your score.

If your score is 19 or less, your asthma may not be controlled as well as it could be. Talk to your doctor.

1. In the past **4 weeks**, how much of the time did your **asthma** keep you from getting as much done at work, school or at home?

All of the time	1	Most of the time	2	Some of the time	3	A little of the time	4	None of the time	5	SCORE

2. During the past **4 weeks**, how often have you had shortness of breath?

More than once a day	1	Once a day	2	3 to 6 times a week	3	Once or twice a week	4	Not at all	5	

3. During the past **4 weeks**, how often did your **asthma** symptoms (wheezing, coughing, shortness of breath, chest tightness or pain) wake you up at night or earlier than usual in the morning?

4 or more nights a week	1	2 or 3 nights a week	2	Once a week	3	Once or twice	4	Not at all	5	

4. During the past **4 weeks**, how often have you used your rescue inhaler or nebulizer medication (such as albuterol)?

3 or more times per day	1	1 or 2 times per day	2	2 or 3 times per week	3	Once a week or less	4	Not at all	5	

5. How would you rate your **asthma** control during the past **4 weeks**?

Not controlled at all	1	Poorly controlled	2	Somewhat controlled	3	Well controlled	4	Completely controlled	5	TOTAL

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Asthma Control Test is a trademark of QualityMetric Incorporated.

Signature of Candidate

Signature of Supervisor

Status of Asthma Controlled / Uncontrolled

Number of times child with above symptoms has :

1. Gone to Doctor for checkup, other than regular visit _____
2. Gone to Emergency Department for Nebulizations in last 12 months_____
3. Admitted to hospital for exacerbation in last 12 months_____
4. Missed school, number of days in last 12 months_____

Exacerbations: Yes/No If yes 1 or more in 1 year/1 in any week

Associated fever ☐ Always ☐ Never ☐ Sometimes

Predisposing factor

Seasonal ☐ Summer (March to June) ☐ Monsoon (July-Oct) ☐ Winter (Non-Feb)

☐ Emotions (laughing/crying) ☐ Pollen ☐ Food

☐ Exercise ☐ Repeated Viral Infections (last 4 weeks)

☐ Fumes ☐ Dust

List of possible pollutants to be discussed

- *Exhaled tobacco smoke exposure*
- *Traffic density near home/school*
- *Industries near home/school*
- *Home/ Neighbourhood construction activity*
- *Cooking: use of wood/coal/ kerosene*
- *Type of room heating: biomass/ coal*
- *Pets: dogs/cats*
- *House dust mite*
- *Mould/ Wet walls in home*
- *Chemicals used at home for cleaning*
- *Use of Agarbatti /candles*
- *Mosquito coils*
- *Stubble Burning fumes exposure*

Signature of Candidate

Signature of Supervisor

Drug history

Device used

a) Metered dose inhaler (MDI) with spacer Yes/No

Is Spacer always used while administration of MDI Yes/ No

b) Rotahaler Yes/No

No. of regular Chest clinic visits in last 3 months: ____Out of 3

Home Nebulization used as SOS basis of Bronchodilators Y/N

Oral steroids use in last 4 weeks Y/N

Gestation at Birth: Term/ Preterm

Exclusive Breast feeding (4-6 months): Y/N_____

Family History:

H/o allergy ☐ Yes ☐ No

If yes ☐ Asthma ☐ Urticaria

☐ Eczema ☐ Conjunctivitis Other specify _____

Relation patient

☐ Mother ☐ Father ☐ Siblings ☐ Grandparents

Smoking in Family: Y/N_____

Investigations

Eosinophil (> 4%) Yes/No

Vit D levels:_____Impression

PEFR:_____Impression

Spirometry_____Impression

Physical examination (Age____)

Height_____expected for age _____

Weight_____expected for age _____

BMI : _____

Obesity/ Overweight/ Underweight

Signature of Candidate

Signature of Supervisor

☐ GERD ☐ Nasal polyp ☐ Adenoids

☐ Allergic Rhinitis

Measure of MDI Inhaled corticosteroid Adherence *was the percentage of inhalations performed correctly between visits 1 and 2.*
Patients were defined as

- Adherents when ≥80% of the doses prescribed were taken,
- Intermediate adherent when took between 50% and 80%, and
- Non-adherent when took ≤50%.

Inhaler device Technique check list

- Impression: *Good Technique/ Poor Technique*

Inhaler device Technique check list

MDI with spacer

1. *Remove the cap of the spacer.*
2. *Remove the cap of the puffer. Shake the puffer 5 or 6 times.*
3. *Insert the puffer in the hole at the back of the spacer.*
4. *Blow all your breath out until lungs are empty.*
5. *Insert the spacer mouthpiece into the mouth*
6. *Press the down once on the puffer's canister.*
7. *Slowly breathe in from the spacer full breath.*
8. *Hold your breath for at least 4 seconds*

*Critical mistakes:

1. **Pressure metered dose inhalers (pMDIs):**

- *Do not remove the cover,*
- *Do not hold the inhaler in a vertical position,*
- *Firing the device before beginning inspiration,*
- *inhalation stopped,*
- *inhalation too fast,*
- *incorrect insertion of mdi into the inhaler camera,*
- *Several device firing in the same inhalation,*
- *No breath hold after inhalation,*
- *Cough during inhalation.*

Signature of Candidate

Signature of Supervisor

Impact of poor Asthma Control

- *Limitations in sports, play and daily activities*
- *Absent from school*
- *Parent absent from work*
- *Impact on sleep*
- *Impact on growth*
- *Psychosocial impact*

Signature of Candidate

Signature of Supervisor

INFORMED PATIENT CONSENT

Date: _____

I.....D/o, W/o, S/o.....
.....am willing to participate in the study. I am ready to participate in this study on my own **"STUDY OF FACTORS AFFECTING POOR CONTROL OF BRONCHIAL ASTHMA IN CHILDREN"** I affirm that I have not been given any financial incentive and no pressure has been put on me to give the consent. The purpose of this research has been explained to me and I believe that it is for the benefit of science and mankind. I have been explained about the risk in this research and I understand that the risk is very minimal. I have been explained the method of participating in this research work.

I can choose to opt out of this research at any time and my opting out will not have any effect on my treatment.

.....
Signature of the Witness

.....
Signature of the patient

Name:

Signature of Candidate

Signature of Supervisor

मरीज अनुमति फार्म

तिथि _____

मैं _____ पत्नी/पुत्र/पुत्री _____

निवासी _____

इस शोधकार्य **"STUDY OF FACTORS AFFECTING POOR CONTROL OF BRONCHIAL ASTHMA IN CHILDREN"** में भाग लेने के लिए सहमत हूँ। मैं इस शोधकार्य में भाग लेने के लिए अपनी स्वेच्छा से तैयार हूँ। मैं पुष्टि करता/करती हूँ की यह स्वीकृति देने के लिए मुझे कोई आर्थिक प्रलोभन नहीं दिया गया और न ही दबाव डाला गया है। मुझे इस शोधकार्य का उद्देश्य स्पष्ट कर दिया गया है और मुझे यह विश्वास है की यह विज्ञान और मानवता के लाभ के लिए है। मुझे इस शोधकार्य में होने वाले जोखिम के बारे में समझा दिया गया है और मेरी समझ में यह जोखिम बहुत मामुली है।

मैं इस शोधकार्य में भाग लेने के सम्बन्ध में किसी भी समय अपनी अस्वीकृति व्यक्त कर सकता/सकती हूँ और मेरे अस्वीकृति व्यक्त करने का मेरे इलाज पर कोई प्रभाव नहीं पड़ेगा।

_____ _____

गवाह के हस्ताक्षर रोगी के हस्ताक्षर/अंगूठे का निशान

नाम: नाम:

_____

अन्वेषक के हस्ताक्षर

_____

विद्यार्थी के हस्ताक्षर

ਮਰੀਜ਼ ਰਜ਼ਾਮੰਦੀ ਫਾਰਮ

ਮਿਤੀ_____

ਮੈ_____ਪਤਨੀ/ਪੁੱਤਰ/ਪੁੱਤਰੀ_____

ਵਾਸੀ _____

"STUDY OF FACTORS AFFECTING POOR CONTROL OF BRONCHIAL ASTHMA IN CHILDREN" ਤੇ ਚਲ ਰਹੀ ਖੋਜ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਰਜ਼ਾਮੰਦ ਹਾਂ। ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਮੈ ਆਪਣੀ ਮਰਜ਼ੀ ਨਾਲ ਤਿਆਰ ਹਾਂ। ਮੈ ਇਹ ਦਸਣਾ ਚਾਹੁੰਦਾ ਹਾਂ/ ਚਾਹੁੰਦੀ ਹਾਂ ਕੇ ਇਹ ਰਜ਼ਾਮੰਦੀ ਦੇਣ ਵਾਸਤੇ ਮੈਨੂ ਕਿਸੇ ਵੀ ਤਰਾਂ ਦਾ ਲੋਭ-ਲਾਲਚ ਨਹੀ ਦਿੱਤਾ ਗਿਆ ਅਤੇ ਨਾ ਹੀ ਕੋਈ ਦਬਾ ਪਾਇਆ ਗਿਆ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਦਾ ਮਨੋਰਥ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ ਅਤੇ ਮੈਨੂ ਇਹ ਭਰੋਸਾ ਦਵਾਇਆ ਗਿਆ ਹੈ ਕੇ ਇਹ ਖੋਜ ਵਿਗਿਆਨ ਅਤੇ ਮਾਨਵਤਾ ਦੀ ਭਲਾਈ ਲਈ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਵਿਚ ਹੋਣ ਵਾਲੇ ਖਤਰੇ ਬਾਰੇ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ ਅਤੇ ਮੈਨੂ ਇਹ ਯਕੀਨ ਹੈ ਕੇ ਇਹ ਖਤਰਾ ਬਹੁਤ ਮਾਮੂਲੀ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਦਾ ਢੰਗ – ਤਰੀਕਾ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ।

ਮੈ ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਬਾਰੇ ਆਪਣੀ ਰਜ਼ਾਮੰਦੀ ਕਿਸੇ ਵੀ ਸਮੇ ਵਾਪਸ ਲੈ ਸਕਦਾ ਹਾਂ/ ਸਕਦੀ ਹਾਂ ਅਤੇ ਮੇਰੀ ਰਜ਼ਾਮੰਦੀ ਵਾਪਸ ਲੈਣ ਦਾ ਮੇਰੇ ਇਲਾਜ ਤੇ ਕੋਈ ਅਸਰ ਨਹੀ ਹੋਵੇਗਾ।

_____ _____

ਗਵਾਹ ਦੇ ਹਸਤਾਖਰ ਮਰੀਜ਼ ਦੇ ਹਸਤਾਖਰ

ਮਿਤੀ_____ ਮਿਤੀ_____

ਪਤਾ _____ ਪਤਾ _____

_____

ਨਿਰੀਖਕ ਦੇ ਹਸਤਾਖਰ

_____

ਸਿਖਿਆਰਥੀ ਦੇ ਹਸਤਾਖਰ

PATIENT'S PARENT/GUARDIAN CONSENT FORM

Date: ____/____/____

I .....F/o, M/o ..... R/o ..... am willing to let my child participate in the study entitled Bed **"STUDY OF FACTORS AFFECTING POOR CONTROL OF BRONCHIAL ASTHMA IN CHILDREN"**. The procedure with its complications has been explained to me in local vernacular language. I have fully understood that no special tests and extra expenditure in any form, merely for the purpose of thesis is being carried out. I am free to opt out the study any time without assigning any reason. This will not affect my treatment and investigation of my child.

Signature of the Witness
Name:

Signature/Thumb Impression of guardian
Name:

Signature of the Supervisor

Signature of Candidate

ਮਰੀਜ ਦੇ ਮਾਤਾ/ਪਿਤਾ ਦਾ ਰਜ਼ਾਮੰਦੀ ਫਾਰਮ

ਮਿਤੀ __/___/____

ਮੈਂ _____ ਪਿਤਾ/ਮਾਤਾ _____,

ਵਾਸੀ _____

ਆਪਣੇ ਬੱਚੇ ਦੇ ਇਸ ਅਧਿਐਨ ਵਿੱਚ ਹਿੱਸਾ ਲੈਣ ਤੇ ਰਜ਼ਾਮੰਦ ਹਾਂ। ਇਸ ਖੋਜ ਕੰਮ ਵਿੱਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਮੈਂ ਆਪਣੀ ਮਰਜ਼ੀ ਨਾਲ ਤਿਆਰ ਹਾਂ। ਮੈਂ ਇਹ ਦਸਣਾ ਚਾਹੁੰਦਾ/ਚਾਹੁੰਦੀ ਹਾਂ ਕਿ ਇਹ ਰਜ਼ਾਮੰਦੀ ਦੇਣ ਵਾਸਤੇ ਮੈਨੂੰ ਕਿਸੇ ਵੀ ਤਰ੍ਹਾਂ ਦਾ ਲੋਭ-ਲਾਲਚ ਨਹੀਂ ਦਿੱਤਾ ਗਿਆ ਅਤੇ ਨਾ ਹੀ ਕੋਈ ਦਬਾ ਪਾਇਆ ਗਿਆ ਹੈ। ਮੈਨੂੰ ਇਸ ਖੋਜ ਦਾ ਮਨੋਰਥ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ ਅਤੇ ਮੈਨੂੰ ਇਹ ਭਰੋਸਾ ਦਵਾਇਆ ਗਿਆ ਹੈ ਇਹ ਖੋਜ ਵਿਗਿਆਨ ਅਤੇ ਮਾਨਵਤਾ ਦੀ ਭਲਾਈ ਲਈ ਹੈ। ਮੈਨੂੰ ਇਸ ਖੋਜ ਵਿੱਚ ਹੋਣ ਵਾਲੇ ਖਤਰੇ ਬਾਰੇ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆਂ ਹੈ ਅਤੇ ਮੈਨੂੰ ਇਹ ਯਕੀਨ ਹੈ ਕਿ ਇਹ ਖਤਰਾ ਬਹੁਤਾ ਮਾਮੂਲੀ ਹੈ। ਮੈਨੂੰ ਇਸ ਖੋਜ ਕੰਮ ਵਿੱਚ ਹਿੱਸਾ ਲੈਣ ਦਾ ਢੰਗ-ਤਰੀਕਾ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ।

ਮੈਂ ਇਸ ਖੋਜ ਕੰਮ ਵਿੱਚ ਹਿੱਸਾ ਲੈਣ ਬਾਰੇ ਆਪਣੀ ਰਜ਼ਾਮੰਦੀ ਕਿਸੇ ਵੀ ਸਮੇਂ ਵਾਪਸ ਲੈ ਸਕਦਾ/ਸਕਦੀ ਹਾਂ ਅਤੇ ਮੇਰੀ ਰਜ਼ਾਮੰਦੀ ਵਾਪਸ ਲੈਣ ਦਾ ਮੇਰੇ ਬੱਚੇ ਦੇ ਇਲਾਜ ਤੇ ਕੋਈ ਅਸਰ ਨਹੀਂ ਹੋਵੇਗਾ।

_____ _____

ਗਵਾਹ ਦੇ ਹਸਤਾਖਰ ਮਰੀਜ਼ ਦੇ ਹਸਤਾਖਰ

ਮਿਤੀ _____ ਮਿਤੀ _____

ਪਤਾ _____ ਪਤਾ _____

_____ _____

ਨਰੀਖਕ ਦੇ ਹਸਤਾਖਰ ਸਿਖਿਆਰਥੀ ਦੇ ਹਸਤਾਖਰ

मरीज के माता/पिता का अनुमति फार्म

तिथि ___/___/___

मैं _____ पिता/माता/_____ वासी _____, अपने बच्चे के इस शोधकार्य में भाग लेने के लिए सहमत हूँ। मैं इस शोधकार्य में भाग लेने के लिए अपनी स्वेच्छा से तैयार हूँ। मैं पुष्टि करता/करती हूँ कि स्वीकृत देने के लिए मुझे कोई आर्थिक प्रलोभन नहीं दिया गया और न ही दबाव डाला गया है। मुझे इस शोधकार्य का उद्देश्य स्पष्ट कर दिया गया है और मुझे यह विश्वास है कि यह विज्ञान और मानवता के लाभ के लिए है। मुझे इस शोधकार्य में होने वाले जोखिम के बारे में समझा दिया गया है और मेरी समझ में यह जोखिम बहुत मामूली है।

मैं इस शोधकार्य में भाग लेने के सम्बन्ध में किसी भी समय अपनी अस्वीकृति व्यक्त कर सकता/सकती हूँ और मेरे अस्वीकृति व्यक्त करने का मेरे बच्चे के इलाज पर कोई प्रभाव नहीं पड़ेगा।

_____ _____

गवाह के हस्ताक्षर मरीज के माता/पिता के हस्ताक्षर

तिथि _____

पता _____

_____

_____

_____ _____

नरीक्षक के हस्ताक्षर प्रत्याक्षी के हस्ताक्षर